



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011 (225)
November 1981

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 225)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in October 1981 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 149 reports, articles and other documents announced during October 1981 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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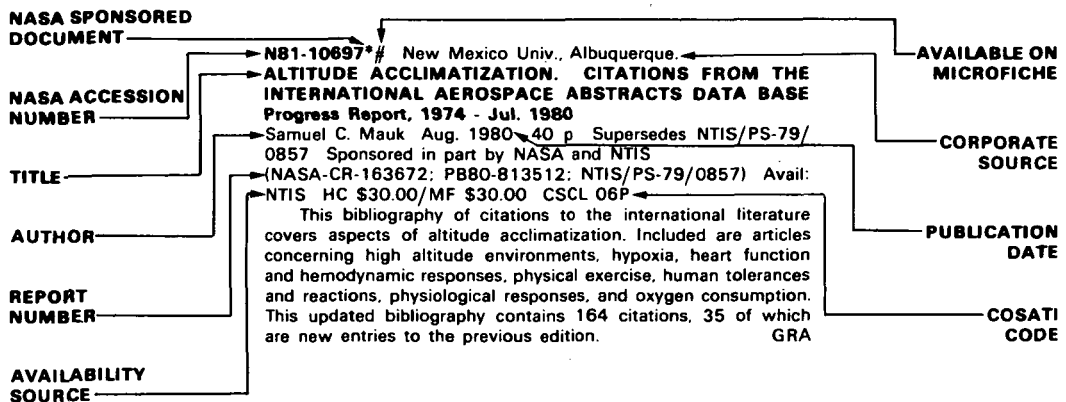
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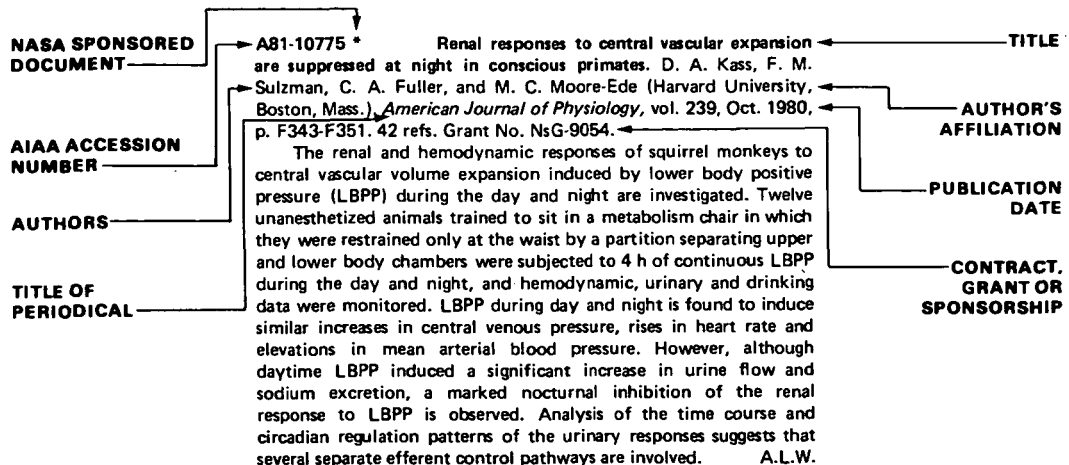
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 225)

NOVEMBER 1981

IAA ENTRIES

A81-41361 # Model problem of biped walking with vertical uncomfatableness (Model'naia zadacha dvunogoi khod'by s vertikal'noi nekomfortabel'nost'iu). V. V. Beletskii and M. D. Golubitskaia. *Moskovskii Universitet, Vestnik, Seriya 1 - Matematika, Mekhanika*, May-June 1981, p. 62-68. 6 refs. In Russian.

The paper examines the vertical oscillations of a biped-walking machine with vertical oscillations or uncomfatableness (the comfortable walking of such a machine is defined as walking with uniform and rectilinear motion of the suspension points of the legs). These oscillations are shown to be useful for minimizing both energy expenditures and controlling actions. The combination of continuous and pulsed controls is shown to be energy-optimal. B.J.

A81-41445 # The Space Sled - A European facility for life-science experiments in Spacelab. A. F. L. Soons, D. F. Burden, M. J. Garvin, and D. Wyn-Roberts (ESA, European Space Research and Technology Centre, Noordwijk, Netherlands). *ESA Journal*, vol. 5, no. 2, 1981, p. 99-108.

The Space Sled developed by ESA to serve as a facility for life-science research to be conducted during space missions in the absence of gravity, is discussed. The sled system consists of the sled facility and the experimenter-provided hardware which can be easily integrated via standard interfaces. Motion profiles provided by the facility are sinusoidal oscillations and constant g oscillations. The linear-accelerator stimuli are suited for investigation of the vestibular inner-ear organs, motion-perception mechanisms, and reflex processes. The two principal elements of the sled facility, the mechanical subsystem and the electronic units are described in detail and the physical data are provided. Sled safety and protection features and performance characteristics are given. The test data indicate that the motion accuracies during sled operations in the absence of gravity are predicted to be: maximum error in the velocity profile of 20 mm/s, and maximum amplitude (200 mg) of 20 mg. It is concluded that the velocity perturbation quoted is fairly constant for all selectable speed amplitudes. E.B.

A81-41724 The effects of dynamic space flight factors on animals (Vliianie dinamicheskikh faktorov kosmicheskogo poleta na organizm zhivotnykh). Edited by A. M. Genin. Moscow, Izdatel'stvo Nauka, 1979. 248 p. In Russian.

Results are presented of physiological, biochemical and morphological studies of the effects of space flight dynamic conditions, particularly weightlessness, on experimental animals carried on board biosatellites of the Cosmos series. Areas covered include the general state of the organisms immediately after flight and in the readaptation period, neurochemical characteristics, protein synthesis, the ultrastructure of the adrenal cortex, the hypothalamo-hypophyseal neurosecretory system, skeletal muscle metabolism, the structural and functional organization of the vestibular apparatus, skeletal bones, hemopoiesis, cellular immunity, internal organs including the gastrointestinal tract, kidneys, and lungs, and the effects of cosmic rays on the retina. The majority of the experiments were performed on rats carried for 19.5 days on Cosmos 782. A.L.W.

A81-41779 # Body position stabilization - A fundamental problem of postural regulation (Stabilizatsiia polozheniia korpusa - Osnovnaia zadacha poznoi regulatsii). V. S. Gurfinkel', M. I.

Lipshits, K. E. Popov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR), and S. Mori (Ashikawa Medical School, Hokkaido, Japan). *Fiziologiya Cheloveka*, vol. 7, May-June 1981, p. 400-410. 33 refs. In Russian.

The primary parameter by which vertical posture is regulated and the section of the body on which primary postural control is exerted are investigated. The effects of body displacements and changes in the angle of the talocrural joint on the postural activity of the leg muscles were measured in subjects standing on a metal platform with a rhythmically varying tilt. Experiments performed with the position of the head fixed have shown head position not to be the major determinant in vertical posture regulation. Results also indicate that muscle postural activity is not determined by changes in muscle length. A constant phase relationship between electromyogram activity and body displacements, however, indicates that the body is the principal object of postural control, with information about body position most likely supplied by the proprioceptor apparatus. A.L.W.

A81-41780 # A quantitative analysis of preliminary postural components of complex voluntary motion (Kolichestvennyi analiz uprezhdainshchikh poznykh komponentov slozhnogo proizvol'nogo dvizheniia). M. I. Lipshits, K. E. Popov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR), and K. Mourits (Freiburg, Universität, Freiburg im Breisgau, West Germany). *Fiziologiya Cheloveka*, vol. 7, May-June 1981, p. 411-419. 10 refs. In Russian.

The preliminary postural components of complex voluntary motion were studied in six men and one woman asked to take a position on tiptoes from an original standing posture. The parameters of the preliminary postural components of motion were found to depend both on the final position and on such factors as the original location of the center of gravity and the presence of an external load. In addition, results indicated that modification of the biomechanical conditions during execution of the task influenced the parameters of the postural component. C.K.D.

A81-41785 Effect of low-potassium diet on rat exercise hyperthermia and heatstroke mortality. R. W. Hubbard, M. Mager, W. D. Bowers, I. Leav, G. Angoff, W. T. Matthew, and I. V. Sils (U.S. Army, Research Institute of Environmental Medicine, Natick, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 8-13. 29 refs.

To examine the effects of K deficiency on rat exercise hyperthermia and heatstroke mortality and the impact of total body K deficiency on the risk of myocardial intoxication, 182 rats were divided into control and test groups with the test rats being fed a potassium deficient diet. All but 50 rats which were sacrificed for comparison tissue were paced through exhaustive shock avoidance treadmill running. Run rats that died during the test or lived 24 hrs were used for tissue samples from heart, liver, kidney, and gastrocnemius muscle and blood sodium and potassium contents were measured by flame photometry. The potassium deficient rats weighed less, ran slower, and performed less work than did the controls; also, post-run low-K rats exhibited a 90% increase in plasma potassium levels, thus ruling out death from myocardial potassium intoxication because the levels then equaled those of the sedentary control rats. The equality of rectal core temperatures was taken as evidence of impaired thermoregulatory ability causing an enhanced disposition to exercise induced hyperthermia, with consequent predisposition to tissue damage and mortality. It is noted that the

presence of heatstroke in potassium deficient patients may present a high-risk emergency that is difficult to diagnose. D.H.K.

A81-41786 Energy expenditure during load carriage at high altitude. A. Cymerman, K. B. Pandolf, A. J. Young, and J. T. Maher (U.S. Army, Research Institute of Environmental Medicine, Natick, MA). (*Federation of American Societies for Experimental Biology, Meeting, 64th, Anaheim, CA, Apr. 13-18, 1980.*) *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 14-18. 26 refs.

The feasibility of using the Pandolf sea-level model (1977) to predict energy expenditure during load carriage at high altitudes has been investigated. The effect of three loads and three grades on the ability to sustain a 10-minute walk at 1.12 m/sec was studied in five subjects over a period of 9 days' stay at high altitude (4300 m). Oxygen uptake data were compared with predicted values. The Pandolf equation was found to give a satisfactory estimate of energy expenditure as long as appreciable energy deficits are not incurred and steady-state conditions are achieved. C.K.D.

A81-41787 Effect of dehydration on thermoregulation in cats exposed to high ambient temperatures. P. A. Doris and M. A. Baker (California, University, Riverside, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 46-54. 34 refs. NSF Grant No. BN-5-76-81839; Grant No. NIH-RR-09070.

The effect of different degrees of heat and dehydration stress on the body temperature, evaporative water loss, and metabolic rate (MR) in cats has been investigated. These parameters were measured in animals exposed to several high ambient temperatures (35, 38, 40 and 43 C) and subjected to progressive dehydration. Multiple linear regression analyses of the data suggest that dehydration decreases the evaporative response to elevations of body core temperature, indicating a modification of the sensitivity of the thermoregulatory system. Dehydration results in a lower metabolic rate for a given body temperature due to modified ventilatory energy expenditure. A model which permits prediction of the metabolic cost of ventilation in the cat has been obtained by including the respiratory rate as a third variable in the model of Schmidt-Nielsen et al. (1976). C.K.D.

A81-41788 * Protein synthesis rates in atrophied gastrocnemius muscles after limb immobilization. K. R. Tucker, M. J. Seider, and F. W. Booth (Texas, University, Houston, TX). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 73-77. 17 refs. Grant No. PHS-AM-19393; Contract No. NAS9-15388.

Noting that protein synthesis declines in the gastrocnemius 6 hr after immobilization, the study sought to detect an increase of protein synthesis when the limb was freed, and to examine the effects of exercise on the rate of increase. Rats were used as subjects, with their hind legs in plaster of Paris in plantar flexion to eliminate strain on the gastrocnemius. Periods of immobilization were varied and samples of blood from the muscle were taken to track protein synthesis rates for different groups in immobilization and exercise regimens (running and weightlifting). Synthesis rates declined 3.6% during time in the cast, then increased 6.3%/day after the casts were removed. Both running and weightlifting were found to increase the fractional rate of protein formation in the gastrocnemius muscle when compared with contralateral muscles that were not exercised and were used as controls, suggesting that the mechanism controlling protein synthesis in skeletal muscles is rapidly responsive to changes in muscular contractile activity. D.H.K.

A81-41789 Hypoxia effects on plasma volume shifts at rest, work, and recovery in supine posture. D. S. Miles, D. R. Bransford, and S. M. Horvath (California, University, Santa Barbara, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 148-153. 28 refs. Grants No. AF-AFOSR-78-3534; No. NIH-AG-00073.

A study was made to determine if exercise affected the blood plasma volume of subjects in supine position. Nine adult males underwent alternating rest and work cycles while lying down and given hypoxic gas to breathe during performance of submaximal (heart rate 140/min) and maximal (160/min) exercise. Blood samples were taken during each phase of the tests to monitor hematocrit, hemoglobin, and lactate levels, and continuous ECG readings were

recorded. Heart rates were higher in hypoxic conditions and significant loss in plasma occurred in both normoxic and hypoxic conditions. A maximum plasma volume loss of 20% of initial volume is reported and comparison with results of other experiments indicates that plasma loss with exercise decreases with increasing altitude under normoxic conditions, with minimum losses noted during supine posture. Acute hypoxic exposure of less than 2 hr was found to have no effect on plasma volume efflux in unacclimatized men during maximal or submaximal exercise in the supine position. D.H.K.

A81-41790 Reduced norepinephrine response to dynamic exercise in human subjects during O₂ breathing. B. Hesse, I.-L. Kanstrup, N. J. Christensen, T. Ingemann-Hansen, J. F. Hansen, J. Halkjaer-Kristensen, and F. B. Petersen (August Krogh Institutet, Copenhagen, Denmark). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 176-178. 16 refs. Research supported by the Danish Space Research Council and Danish Medical Research Foundation.

The influence of hyperoxia on catecholamine response to dynamic exercise was studied. While breathing either 21 or 100% O₂, seven subjects performed submaximal bicycle exercise. Arterial blood pressure was similar in both exercise experiments. The CO₂ output was not influenced by 100% O₂ breathing, but increments in plasma lactate concentration were reduced. The increases in plasma norepinephrine and epinephrine concentrations and heart rate were significantly lower during 100% O₂ than during 21% O₂ breathing. The results suggest that O₂ plays an important role in the regulation of sympathetic nervous activity during dynamic exercise in humans. (Author)

A81-41791 Effect of CO₂ set point on ventilatory response to exercise. A. Oren, K. Wasserman, J. A. Davis, and B. J. Whipp (California, University, Harbor Medical Center, Torrance, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 51, July 1981, p. 185-189. 19 refs. Grants No. NIH-HL-11907; No. NIH-HL-07388.

Chronic metabolic acidosis and alkalosis were induced in 7 adult subjects to test the effects of altering the CO₂ partial pressure of 40 torr at rest. Acidosis was induced by ingestion of NH₄Cl capsules and alkalosis by NaHCO₃ capsules for three days and a work load reaching 60-120 W was performed. Blood samples were taken during various times of incrementally increasing work and breath samples for CO₂ and O₂ partial pressures were analyzed by mass spectroscopy; the exercises were kept below anaerobic levels of lactate formation increase. Ventilatory response significantly increased with load under acidosis and the CO₂ partial pressure was found to establish a new resting volume, a condition also present in metabolic alkalosis, where ventilatory response increase was slowed. The results indicate the existence of a partial pressure CO₂ 'set point', which can be altered to different levels by changes in the acid-base balance, in line with findings of other researchers. D.H.K.

A81-41813 # Development of a secondary task method for measuring operator workload. III - A change of secondary task performance during flight by T-2 flight simulator. IV - Effects of subsidiary signal modes on secondary task performance. Y. Nagasawa, H. Hagihara, S. Aramaki, and N. Utsuki (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 21, Dec. 1980, p. 189-207. 19 refs. In Japanese, with abstract in English.

An auditory discriminative secondary task consisting of two different randomly presented signals was assigned to three subjects during flight training on the T-2 flight simulator. The subjects were to discriminate between signals and respond at their own pace during a series of air maneuvers. Subjective ratings, miss rates and response times were measured as workload indicators and it was found that flying performance was not affected by the tasks. It was proposed that visual be synchronized with auditory signals in actual flying conditions. In addition, subsidiary signal effects on five subjects during T-2 flight simulation were studied as a discrimination task for secondary workload measurement. Responses to two different auditory signals, red and green lights and synchronized auditory and visual signals were measured for three flight maneuvers with subjects responding at their own pace. Performance was analyzed on the basis of subjective ratings, computerized flight performance scores, miss

rates and response times. Results showed high discriminability for visual-auditory and low discriminability for visual signals, high miss rates for visual and low miss rates for visual-auditory signals, high miss rates for angle of attack turn maneuver and low miss rates for straight level flying while response rate changes were similar to miss rate variations. D.B.

A81-41814 # Effects of sustained exposure to hypoxic environment on avoidance behaviour in rats. I. Sakurai, E. Sakaguchi, H. Osada, T. Sakaguchi, and A. Nakamura (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 21, Dec. 1980, p. 209-214. 11 refs. In Japanese, with abstract in English.

A previous experiment using food as reinforcement showed decreased operant behavior in rats during hypoxia. The present experiment used electric shock as reinforcement to exclude secondary appetite effects and rats were trained to press levers for shock avoidance on Sidman avoidance schedule in a normal oxic environment. They were then subjected to hypoxia (18,000 ft) for one week which led to a sharp drop in learned avoidance and many electric shocks in the first few days with gradual subsequent return to previous response level. Disrupted behavior under hypoxia was thus affected by decreased appetite and closely related to impaired brain functioning. D.B.

A81-42023 * Enhanced skeletal muscle insulin sensitivity in year-old rats adapted to hypergravity. C. E. Mondon (Stanford University, Palo Alto, CA), C. B. Dolkas (U.S. Veterans Administration, Medical Center, Palo Alto, CA), and J. Oyama (NASA, Ames Research Center, Moffett Field, CA). *American Journal of Physiology*, vol. 240, 1981, p. E482-E488. 30 refs. Research supported by the U.S. Veterans Administration and NASA.

Rats induced into a hypermetabolic state by exposure to chronic (7 mo) centrifugation at 4.15 g exhibited increased glucose uptake at lower plasma insulin levels than weight-matched control animals following oral glucose administration. In order to determine the insulin sensitivity of specific tissues, the effect of exogenous insulin on glucose uptake by isolated perfused livers and hindlimb skeletal muscle from rats adapted to chronic centrifugation for one year was compared with perfused tissue from 2.5 mo-old noncentrifuged control animals of equal body weight. Metabolic glucose clearance by skeletal muscle from hypergravic rats did not prove significantly greater than control muscle when perfused in the absence of insulin (10.6 vs 8.1 microliters/min-g-muscle), but was twice as fast (23.0 vs 9.5) at perfusate insulin levels of 35 micro-U/ml. Conversely, glucose uptake by hypergravic livers was significantly decreased (P is less than 0.001) compared with control livers (10.3 vs 27.8) at perfusate insulin levels of 40 micro-U/ml. Results suggest that skeletal muscle rather than liver is primarily responsible for the enhanced sensitivity to insulin and the increased energy expenditure observed in rats subjected to hypergravity. J.F.

A81-42050 * Production of NO₂⁻ and N₂O by nitrifying bacteria at reduced concentrations of oxygen. T. J. Goreau, W. A. Kaplan, S. C. Wofsy, M. B. McElroy (Harvard University, Cambridge, MA), F. W. Valois, and S. W. Watson (Woods Hole Oceanographic Institution, Woods Hole, MA). *Applied and Environmental Microbiology*, vol. 40, Sept. 1980, p. 526-532. 40 refs. NSF Grants No. PFR-76-24239; No. DEB-79-20282; No. COE-78-19595; Contract No. NASw-2952.

The influence of oxygen concentration on the production of NO₂⁻ and N₂O by nitrifying marine bacteria of the genus *Nitrosomonas* is investigated. Pure cultures of the ammonium-oxidizing bacteria isolated from the Western Tropical Atlantic Ocean were grown at oxygen partial pressures from 0.005 to 0.2 atm, and concentrations of N₂O in the air above the growth medium and dissolved NO₂⁻ were determined. Decreasing oxygen concentrations are observed to induce a marked decrease in NO₂⁻ production rates and increase in N₂O evolution, leading to an increase of the relative yield of N₂O with respect to NO₂⁻ from 0.3% to nearly 10%. Similar yields of N₂O at atmospheric oxygen levels are found for nitrifying bacteria of the genera *Nitrosomonas*, *Nitrosolobus*, *Nitrospira* and *Nitrosococcus*, while nitrite-oxidizing bacteria and a dinoflagellate did not produce detectable quantities of N₂O. Results support the view that nitrification is a major source of N₂O in the environment. A.L.W.

A81-42110 # Experiment equipment and payloads for life science research on Spacelab. H.-G. Francois, H. Braumann, and P. Schiller. *Dornier-Post* (English Edition), no. 2, 1981, p. 41-44.

Equipment and payloads for life-science experiments aboard Spacelab are examined. Most of the experiments are intended to investigate various effects of gravity and space radiation on cells, tissues, microorganisms, and plants. A fully equipped single rack for the Spacelab life-science experiments is described. Medical experiments on payload specialists and tests of advanced life-support systems for future manned space activities are also discussed. F.G.M.

A81-42132 * Effects of noise frequency on performance and annoyance for women and men. K. F. Key (NASA, Langley Research Center, Hampton, VA) and M. C. Payne, Jr. (Georgia Institute of Technology, Atlanta, GA). *Perceptual and Motor Skills*, vol. 52, 1981, p. 435-441. 6 refs.

Effects of noise frequencies on both performance on a complex psychomotor task and annoyance were investigated for men (n = 30) and women (n = 30). Each subject performed a complex psychomotor task for 50 min in the presence of low-frequency noise, high-frequency noise, or ambient noise. Women and men learned the task at different rates. Little effect of noise was shown. Annoyance ratings were subsequently obtained from each subject for noises of various frequencies by the method of magnitude estimation. High-frequency noises were more annoying than low-frequency noises regardless of sex and immediate prior exposure to noise. Sex differences in annoyance did not occur. No direct relationship between learning to perform a complex task while exposed to noise and annoyance by that noise was demonstrated. (Author)

A81-42133 * Visual fatigue - The need for an integrated model. F. V. Malmstrom (Southern California, University, Los Angeles, CA), R. J. Randle, M. R. Murphy (NASA, Ames Research Center, Moffett Field, CA), L. E. Reed (USAF, Human Resources Laboratory, Wright-Patterson AFB, OH), and R. J. Weber (Oklahoma State University, Stillwater, OK). *Psychonomic Society, Bulletin*, vol. 17, no. 4, 1981, p. 183-186. 20 refs. NASA-USAF-supported research.

Two experiments were conducted to examine possible decrements in performance over time on two visual tracking tasks. In Experiment 1, six subjects tracked a horizontal, sinusoidally moving target in the picture plane for 6.5 min. In Experiment 2, six subjects tracked a target sinusoidally changing focus in the depth plane between 0 and 4 D over 6.5 min. Results indicated a linearly decreasing amplitude of both pursuit eye movements (.29 deg of visual angle per minute) and accommodation (.11 D/min). These visual fatigue effects are discussed in the context of several competing explanations. (Author)

A81-42134 * Preliminary results of in vitro propagation of Guayule. M. N. Dastoor, W. W. Schubert, and G. R. Petersen (California Institute of Technology, Jet Propulsion Laboratory, Chemical and Biological Processes, Pasadena, CA). *Journal of Agricultural and Food Chemistry*, vol. 29, 1981, p. 686-688. Contract No. NAS7-100.

Guayule, *Parthenium argentatum* Gray, was first established in tissue culture by Bonner and Arreguin (1950) as a means to study the effects of various chemicals and extracts on rubber production. The propagation of whole guayule plants from tissue culture, however, has not been accomplished. The reported investigation is concerned with such an objective. In an attempt to stimulate rubber production in Guayule, Yokoyama et al. (1977) sprayed juvenile plants with 2-(3,4-dichloro-phenoxy)triethylamine (TEA derivative). This treatment resulted in increased isoprenoid levels in the plant tissue. In the current investigation, experiments were conducted to study the effect of TEA derivative on in vitro cultures. It was found that a suppression of callus formation occurs at a 10 mg/L concentration of TEA derivative with a resultant increase of shoot formation. Lower and higher concentrations of TEA derivative promote callus formation. G.R.

A81-42137 Life from an orderly cosmos. S. W. Fox (Miami, University, Coral Gables, FL). *Naturwissenschaften*, vol. 67, 1980, p. 575-581. 64 refs.

A review is conducted of some of the evidence for a unified cosmological concept. A cosmic picture is considered with a decline

in order from the most highly ordered state, following the Big Bang, through ordered inanimate matter, to a less ordered state (that of living systems), on to that of dead systems, the least ordered state of the four. This is a reaffirmation, over a broad evolutionary span, of the second law of thermodynamics. Although that principle contradicts a deeply rooted feeling of 'order out of chaos', the history of the second law indicates that expressions of it have from inception of the law appeared to contradict logical inferences. G.R.

A81-42175 * **Electrophoretic cell separation by means of immunomicrospheres.** A. Rembaum (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and A. J. K. Smolka (Alabama, University, Birmingham, AL). In: *Bioelectrochemistry*. New York, Plenum Publishing Corp., 1980, p. 267-272. 12 refs. Contract No. NAS7-100; Grant No. NIH-1-RO1-CA-20668-01.

The electrophoretic mobility of fixed human red blood cells immunologically labeled with polymeric (4-vinyl)pyridine or polyglutaraldehyde microspheres was altered to a considerable extent. This observation was utilized in the preparative scale electrophoretic separation of human and turkey fixed red blood cells, whose mobilities under normal physiological conditions do not differ sufficiently to allow their separation by continuous flow electrophoresis. It is suggested that resolution in the electrophoretic separation of cell subpopulations, currently limited by finite and often overlapping mobility distributions, may be significantly enhanced by immuno-specific labeling of target populations using microspheres. (Author)

A81-42227 * **Modelling of DNA-protein recognition.** R. Rein, R. Garduno, S. Colombano, S. Nir, K. Haydock (Roswell Park Memorial Institute, Buffalo; New York State University, Amherst, NY), and R. D. MacElroy (NASA, Ames Research Center, Moffett Field, CA; Roswell Park Memorial Institute, Buffalo; New York State University, Amherst, NY). In: *Biomolecular structure, conformation, function and evolution. Volume 2 - Physico-chemical and theoretical studies*. Oxford and New York, Pergamon Press, 1980, p. 387-395. 21 refs. Grants No. NCA2-OR-635-701; No. NSG-7305.

Computer model-building procedures using stereochemical principles together with theoretical energy calculations appear to be, at this stage, the most promising route toward the elucidation of DNA-protein binding schemes and recognition principles. A review of models and bonding principles is conducted and approaches to modeling are considered, taking into account possible di-hydrogen-bonding schemes between a peptide and a base (or a base pair) of a double-stranded nucleic acid in the major groove, aspects of computer graphic modeling, and a search for isogeometric helices. The energetics of recognition complexes is discussed and several models for peptide DNA recognition are presented. G.R.

A81-42230 * **How many theories for the origin of /proto-/life.** S. W. Fox (Miami, University, Coral Gables, FL). In: *Biomolecular structure, conformation, function and evolution. Volume 2 - Physico-chemical and theoretical studies*. Oxford and New York, Pergamon Press, 1980, p. 643-646. 19 refs. Grant No. NGR-10-007-008.

The sequence of primordial chemical events leading to contemporary metabolism is considered, taking into account primordial reactants, amino acids, proteinoid, protocells, ATP, polynucleotides, and protein. The right kind of matter, thermal copolyamino acids, can organize itself into cell-like structures, in the absence of discrete lipid, when triggered to do so by water. Another unpredicted result of examination of the microsystems formed was the step-by-step realization that the component processes of a primitive form of replication were latent in the proteinoid microsystems. At the present time, four modes of primitive replication of proteinoid microsystems have been identified, plus one that has the appearance of protosexual reproduction. Two main conceptual pathways have received attention. One is the proteinoid theory, derived from experiments. The other is the DNA-first theory, for which attempts at conceptual construction and experimental support continue to be sought. G.R.

A81-42303 **A comparison of community response to aircraft noise at Toronto International and Oshawa Municipal airports.** S. M. Taylor, F. L. Hall, and S. E. Birnie (McMaster University, Hamilton, Ontario, Canada). *Journal of Sound and*

Vibration, vol. 77, July 22, 1981, p. 233-244. 15 refs. Research supported by Transport Canada.

Debate continues over the validity of a single dose-response relationship to describe annoyance due to transportation noise. Doubts about the appropriateness of a single relationship have centered primarily on the issue of differential response to the same noise level for different sources (e.g., aircraft, road traffic and trains). However, recent work suggests that response may vary for different types of the same source, namely aircraft, dependent upon the character, and specifically the number, of operations. Recent data collected around Toronto International and Oshawa Municipal airports permit a test of differences in four aggregate response variables. For the same NEF level, the percent at all annoyed at the two airports is not statistically different. The percent highly annoyed and the percent reporting speech interference are both significantly greater at Toronto but the percent reporting sleep interruption is greater at Oshawa. These differences can be explained in terms of the operational characteristics of the two airports. (Author)

A81-42514 **Psychological and psychophysiological effects of long duration space flight.** F. R. Akins (Santa Clara, University, Santa Clara, CA). In: *Update on space. Volume 1*.

Granada Hills, CA, National Behavior Systems, 1981, p. 64-81. It has been stated that the technical skills for establishing an actual viable space colony are already available. However, doubts exist regarding the social science skills necessary for such a colony. It is pointed out that disregard for the problems of human interaction in isolated, confined environments could prove disastrous. An important factor would be the definition of the goals of a space colonization mission. The operation of the mission, the leadership and social structure to be used, the psychosocial issues involved, and the eventual outcome of the project will all depend in part on what the specific purpose of the mission will be. Each person's role in the project will have to be clearly outlined and each role given importance whether it be custodian or unit supervisor. Attention is also given to biomedical limitations, circadian rhythms, isolation and confinement, privacy, habitat design features, social norms and structure, and aspects of crew selection. G.R.

A81-42601 # **Evaluation of the reliability of a solution from results of ergatic-system simulation (Ob otsenke dostovernosti resheniya po rezul'tatam modelirovaniya ergaticheskikh sistem).** A. N. Voronin and V. V. Pavlov (Akademiya Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR). *Kibernetika i Vychislitel'naia Tekhnika*, no. 50, 1980, p. 3-7. 7 refs. In Russian.

The paper examines the legitimacy of extending results obtained from the simulation of ergatic control (i.e., man-machine) systems to a real system. The study is based on the formal representation of indeterminacy. An analytic expression is obtained that gives the numerical value of the reliability index of the solution on the basis of system simulation results if the degree of completeness of the model is specified. B.J.

A81-42602 # **Ergatic system for the control of the joint motion of dynamic plants (Ergaticheskaya sistema upravleniya sovmestnym dvizheniem dinamicheskikh ob'ektov).** Iu. P. Bogachuk (Akademiya Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR). *Kibernetika i Vychislitel'naia Tekhnika*, no. 50, 1980, p. 19-22. 5 refs. In Russian.

The paper examines the synthesis of a man-machine system for the control of the joint motion of dynamic plants. The synthesis is carried out on the basis of the principle of stationarity by the method of nonlinear integral invariance. Experimental results on a synthesized control system are presented. B.J.

A81-42626 **Indices of cardiac status.** W. Welkowitz (Rutgers University, Piscataway, NJ). *IEEE Transactions on Biomedical Engineering*, vol. BME-28, Aug. 1981, p. 553-567. 49 refs.

A review of various indices of cardiac status and ventricular performance is presented. Different physical modalities used to measure cardiovascular characteristics are discussed and the methods of elucidating quantitative indices from these measurements are described. Emphasis is placed on cardiac mechanics and a force-velocity-length description of the left ventricle. Finally, indices are derived from simple hemodynamic measurements when these are

combined with equivalent network and dynamic shell models of the heart. (Author)

A81-42627 Detection of noisy visual targets - Models for the effects of spatial uncertainty and signal-to-noise ratio. R. G. Swenson (Harvard University, Boston, MA) and P. F. Judy (Brigham and Women's Hospital, Boston, MA). *Perception and Psychophysics*, vol. 29, no. 6, June 1981, p. 521-534. 13 refs. Research supported by Harvard University; Grants No. PHS-GM-18674; No. NIH-2-9-9696.

An 'extreme-detector' model for detecting spatially uncertain targets in noisy backgrounds predicts how both detection and localization abilities are degraded by increasing the number of possible target locations. Experiments 1 and 2 show that the model accurately predicts detection and localization performance in tasks with two, four, and eight locations from d-prime estimates of the observer's ability to detect the target in a known spatial location. These predictions can be linked to the physical stimuli by combining the extreme-detector model with a 'psychophysical' model that specifies how stimulus measures determine the target's detectability in a given location. Single-parameter fits of four such combined models were compared with estimates of detection and localization performance in Experiment 3, which manipulated the target's physical signal-to-noise ratio across various conditions of an eight-location task. (Author)

A81-42632 # The effect of excessive feeding on the functional state of the organisms of pilots (Vliianie izbytochnogo pitaniia na funktsional'noe sostoiianie organizma letchikov). N. V. Zgoda. *Voenno-Meditsinskii Zhurnal*, May 1981, p. 55, 56. In Russian.

The effects of excessive body mass on indicators of the functional state of the cardiovascular, nervous and other systems of pilots are investigated. Heart rate, arterial pressures, Robinson index, vegetative index and endurance coefficient were determined for subjects grouped according to percentage deviation of body weight from the ideal and subjects with functional disorders (hypertonic asthenia and vegetative vascular instability) before and after physical exercise consisting of 30 sit-ups in 60 sec. Results indicate that excessive body weight, even at levels 105-110% of the ideal, leads to changes in the functional state of the organism which may, to a limited degree, degrade pilot performance. A.L.W.

A81-42722 Quantitative radionuclide angiography in assessment of hemodynamic changes during upright exercise - Observations in normal subjects, patients with coronary artery disease and patients with aortic regurgitation. A. S. Iskandrian, A.-H. Hakki, S. A. Kane, and B. L. Segal (Hahnemann Medical College and Hospital, Philadelphia, PA). *American Journal of Cardiology*, vol. 48, Aug. 1981, p. 239-246. 20 refs.

A81-43369 Reasons for eliminating the 'Age 60' regulation for airline pilots. S. R. Mohler (Wright State University, Dayton, OH). (*International Academy of Aviation and Space Medicine, International Congress of Aviation and Space Medicine, 28th, Montreal, Canada, Sept. 8-11, 1980.*) *Aviation, Space, and Environmental Medicine*, vol. 52, Aug. 1981, p. 445-454. 80 refs.

The calendar age of 60 is no longer medically justifiable as an upper age limit for airline pilots. Advances in gerontologic studies, clinical medicine, and operational flight proficiency evaluations, now allow individual pilot assessments for health status and performance capability. Individualizing the career duration of pilots by eliminating the present age 60 upper limitation will enhance flight safety and efficiency as the highly qualified, experienced, and proficient older healthy pilots continue their productive careers. (Author)

A81-43370 Correlations between visual test results and flying performance on the advanced simulator for pilot training /ASPT/. R. Kruk, D. Regan, K. I. Beverley, and T. Longridge (Centre for Research in Sensory Psychology and Medical Physics, Halifax, Canada; USAF, Human Resources Laboratory, Williams AFB, AZ). *Aviation, Space and Environmental Medicine*, vol. 52, Aug. 1981, p. 455-460. 23 refs. Natural Sciences and Engineering Research Council of Canada Grant No. A-0323; Grant No. AF-AFOSR-78-3711.

Possible correlations between visual test performance and flight performance on the advanced simulator for pilot training (ASPT) and

in actual jet trainer aircraft are investigated. Tests were performed to determine frequency thresholds for image motion, contrast thresholds for image motion, contrast thresholds for sine wave grating detection and tracking responses to an image varying in size or location and compared with simulator performance on the ASPT during restricted visibility landings and flying grades for student jet pilots at two levels, as well as experienced pilot instructors, experienced nonpilot aircrew members and nonflying controls. For the student pilots, landing performance is found to correlate with performance on both visual tracking tests, and flying grades in T37 and T38 aircraft is found to correlate with the results of several visual tests. It is also shown that distinctions may be made between flying and nonflying personnel on the basis of the tracking tests, between the nonflying group and the pilot instructors on the basis of the grating contrast threshold test, and among the various flying groups on the basis of the sideways motion tracking test. A.L.W.

A81-43371 * The guidance of saccadic eye movements to perceptually mislocalized visual and non-visual targets. J. R. Lackner and M. S. Levine (Brandeis University, Waltham, MA). *Aviation, Space, and Environmental Medicine*, vol. 52, Aug. 1981, p. 461-465. 16 refs. Contract No. NAS9-15147.

The present experiment examined whether saccadic eye movements to visual targets are dependent on the perceived directions of the targets or on their retinally specified directions. Perceptual mislocalizations of visual targets were induced by having the target light attached to a subject's stationary hand while his biceps or triceps muscle was vibrated. Such vibration leads to apparent extension or flexion of the subject's restrained forearm and perceived visual motion of the stationary target light. Subjects always made accurate saccadic eye movements to a visual target, even when the target was perceptually mislocalized by as much as 20 deg. By contrast, when subjects made saccadic eye movements to a nonvisual target, the location of their hand in the dark, they always looked to the perceived direction of the target even though it did not necessarily correspond to the true direction. These findings indicate that a distinction is maintained between 'reflexive aspects' of oculomotor control related to foveation and the computation of perceived visual direction. (Author)

A81-43372 The effects on visual discrimination of image movement across the stationary retina. G. R. Barnes and R. Smith (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aviation, Space, and Environmental Medicine*, vol. 52, Aug. 1981, p. 466-472. 15 refs.

The visual performance of human subjects has been investigated during presentation of a digital display moving at constant velocity with regard to the stationary eye. The display was presented for brief periods (10-80 ms) at different luminance levels (0.5-8 cd/sq m), contrast levels (1-16), and display sizes (character height 12-24 arcmin). The probability of correctly identifying the display decreased to 90% when the velocity reached 3-4 deg/s. Performance was improved by increasing digit size, decreasing exposure time, or increasing display luminance. Theoretical arguments have been adduced to indicate the usefulness of the results in predicting performance during continuous display exposure. (Author)

A81-43373 Effects of whole-body vibrations on sensory motor system performance in man. G. M. Gauthier, J. P. Roll, B. Martin, and F. Harlay (Aix-Marseille I, Université, Marseille, France). *Aviation, Space, and Environmental Medicine* vol. 52, Aug. 1981, p. 473-479. 28 refs. Research supported by the Société Nationale Industrielle Aéronautique; Centre National de la Recherche Scientifique Grant No. 272.

The effects of whole-body vibration of a frequency and amplitude encountered on cruising helicopters on human sensorimotor performance at position, velocity and force-controlled tasks are investigated. Subjects performed tasks involving blindfolded arm positioning, the forearm and foot tracking of visual targets, and the foot control of static and dynamic torques while vibrated in a sitting position at 0.1 G and 18 Hz. Systematic over-pointing is observed in both directions in the arm positioning task, while position and velocity errors in the foot and arm tracking task increased and torque holding stability and torque amplitude precision were significantly degraded in the presence of vibration. The observed alterations in position, velocity and force control are attributed to the effects of vibration on the proprioceptive system, and it is suggested, on the

A81-43374

basis of these results, that particular care should be taken in helicopters and other vibrating vehicles to isolate muscles involved in motor tasks from vibration.

A.L.W.

A81-43374

The CYTOS biological experiments carried out on the Soviet orbital station Salyut 6. R. Tixador, G. Richoille (Toulouse III, Université, Toulouse, France), J. Raffin, R. Bost (Centre National d'Etudes Spatiales, Paris, France), V. Kojarinov, and A. Lepskye (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 52, Aug. 1981, p. 485-487. 7 refs. Research supported by the Centre National d'Etudes Spatiales and INTERCOSMOS.

The experimental apparatus and techniques used in the Cytos experiments on the proliferation of paramecia on board the Salyut 6 orbital space station are presented. Cultures of *Paramecium tetraurelia* were grown on a medium inoculated with *Enterobacter aerogenes* at a pH of 6.6 in culture boxes kept on the ground as controls and flown on board Salyut 6 under identical conditions of temperature, pressure and atmospheric composition. Samples were fixed every 12 h for four days during the growth phase of the experiment, when cultures were kept at 25 C. Culture chambers consisted of polyethylene bags containing the culture medium and glass ampullae containing a fixative of 85 percent formaline, 10 percent acetic acid, and 5 percent sulfuric ether. The culture chambers were placed in cases of 20 with devices for releasing the fixative, and eight cases were placed in each of two culture boxes. The experimental culture box was then kept in an incubator consisting of a polyurethane foam thermostatic enclosure designed to maintain a temperature of 25 plus or - 0.1 C.

A.L.W.

A81-43409 *

Semitransparent curtains for control of optical radiation hazards. D. H. Sliney (U.S. Army, Environmental Hygiene Agency, Aberdeen Proving Ground, MD), C. E. Moss (National Institute for Occupational Safety and Health, Cincinnati, OH), C. G. Miller, and J. B. Stephens (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *Applied Optics*, vol. 20, July 15, 1981, p. 2352-2366. 32 refs.

The purposes and functions of semitransparent eye protective curtains are analyzed. Based upon this analysis, functional requirements are developed, and design requirements are specified for optimum curtains to be used with open arc welding and arc cutting processes. Such curtains also protect against other high intensity broad-spectral-band sources such as compact arc lamps. The requirements for filtering out hazardous UV radiation and blue light must be balanced against the need for transparency in the visible spectrum and the need for reduced glare. Infrared attenuation is shown to be of very little importance.

(Author)

STAR ENTRIES

N81-28698* National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

INDIRECT MICROBIAL DETECTION Patent

Judd R. Wilkins, inventor (to NASA) Issued 28 Apr. 1981 8 p
Filed 17 Aug. 1979 Supersedes N80-11756 (18 - 02, p 0241)

(NASA-Case-LAR-12520-1; US-Patent-4,264,728;

US-Patent-Appl-SN-067596; US-Patent-Class-435-5;

US-Patent-Class-204-1T; US-Patent-Class-204-195B;

US-Patent-Class-435-34; US-Patent-Class-435-291) Avail: US Patent and Trademark Office CSCI 06M

The growth of microorganisms in a sample is detected and monitored by culturing microorganisms in a growth medium and detecting a change in potential between two electrodes, separated from the microbial growth by a barrier which is permeable to charged particles but microorganism impermeable.

Official Gazette of the U.S. Patent and Trademark Office

N81-28699# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 14, NO. 6

4 Feb. 1981 140 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 3-86

(JPRS-77311) Avail: NTIS HC A07/MF A01

Laboratory tests were performed on men and animals to determine the effects of aerospace or underwater environments on performance and work capacity. Cardiovascular, musculoskeletal and hormonal systems were monitored to determine body response to weightlessness and other dimensions of space flight stress.

N81-28700# Joint Publications Research Service, Arlington, Va.

MAXIMUM OXYGEN UPTAKE AS A CRITERION OF HUMAN RESISTANCE TO HYPOXIA, HYPERTHERMIA AND HYPOTHERMIA

A. M. Vasilenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 1-10 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 3-10

Avail: NTIS HC A07/MF A01

Physical work capacity is shown to be a adequate indicator of human tolerance to adverse environmental effects. Maximum oxygen uptake being a measure of physical work capacity, is used as a prognostic indicator of human tolerance and adaptive capability in a hypoxic, high or low ambient temperature environment. Increase in maximum oxygen uptake under the influence of training or adaptation to hypoxia is accompanied by increase in heat and cold resistance. Author

N81-28701# Joint Publications Research Service, Arlington, Va.

STUDY OF HEMODYNAMICS AND PHASE STRUCTURE OF CARDIAC CYCLE IN SECOND CREW OF THE SALYUT-6 ORBITAL STATION AT REST

A. D. Yegorov, O. G. Itsekhovskiy, I. I. Kasya, I. V. Alferova, A. P. Polyakova, V. F. Turchaninova, V. I. Bernadskiy, V. G. Doroshev, and Ye. A. Kobzev *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 11-15 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 10-14

Avail: NTIS HC A07/MF A01

During the 140 day flight of the Salyut-6 station cardiovascular examinations were carried out at rest. They showed blood redistribution and hypervolemia of the upper body. They also demonstrated increases in the circulating blood volume and

pulse blood filling of cerebral vessels, development of the phase preload syndrome and simultaneous decrease in blood filling of leg vessels. These changes varied physically in the course of flight. Weightlessness of up to 140 days did not cause any pathologies in the cardiovascular system. Author

N81-28702# Joint Publications Research Service, Arlington, Va.

CHANGES IN HEMOGLOBIN MASS DURING REAL AND SIMULATED SPACE FLIGHTS

I. S. Balakhovskiy, V. I. Legenkov, and R. K. Kiselev *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 16-23 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 14-20

Avail: NTIS HC A07/MF A01

Following space missions of more than two weeks the hemoglobin content decreased. The largest reduction of this parameter was seen after flights of 1 to 2 months (25 - 33 percent of the initial value). In the recovery period the reticulocyte count increased, reaching maximum at the end of the second and the beginning of the third week. Author

N81-28703# Joint Publications Research Service, Arlington, Va.

THEORETICAL LEFT VENTRICULAR EJECTION PERIOD IN WEIGHTLESSNESS

V. A. Degtyarev, N. A. Lapshina, and L. Ya. Andriyako *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 24-28 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 20-23

Avail: NTIS HC A07/MF A01

The relationship between duration of blood ejection and cardiac cycle at rest is described by a linear function. This relationship is maintained in weightlessness as well. The derived formula used in calculations of the ejection phase during an exposure to lower body negative pressure (LBNP) makes it possible to predict LBNP test tolerance in the weightless state. The level of deviation of factual values of heart rate from theoretical values is an additional index used in assessing health status of crewmembers inflight. Author

N81-28704# Joint Publications Research Service, Arlington, Va.

SLEEP DISTINCTIONS, CIRCADIAN RHYTHM OF PHYSIOLOGICAL FUNCTIONS AND EFFICIENCY OF MAN ON FIRST DAY AFTER SHIFT IN SLEEPING-WAKING CYCLE

A. N. Litsov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 29-35 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 23-28

Avail: NTIS HC A07/MF A01

Physiological reactions of 35 male test subjects, aged 25 to 42, were examined during the first day after a 3 to 11 hour work-rest cycle shift within 24 hours. The shift induced noticeable changes in sleep dynamics. Shifts close to inversion (9- and 11-hours) were accompanied by disturbances in the diurnal rhythm of heart rate and may cause deterioration of mental productivity. Negative effects of such time schedules need to be taken into consideration, when developing work-rest regimens for representatives of different occupations. Author

N81-28705# Joint Publications Research Service, Arlington, Va.

HISTAMINE AND SEROTONIN LEVELS IN MAN IN THE PRESENCE OF NERVOUS-EMOTIONAL STRESS

S. Kalandarov, I. D. Frenkel, and L. I. Nekrasova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 36-40 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 29-32

Avail: NTIS HC A07/MF A01

Levels of histamine and serotonin in blood of test subjects kept on a Salyut space diet were measured during their simulated rise to an altitude of 8,000 m, anticipation of an exposure to acceleration and mental work. During simulated rise the level of histamine increased and histaminopeptidic activity of serum decreased. During anticipation of configuration the serotonin concentration grew. Levels of histamine and serotonin did not vary significantly in the test subjects kept on the space diet with certain food supplements. Author

N81-28706# Joint Publications Research Service, Arlington, Va.

MOTOR ACTIVITY OF MAN WHEN IT IS ARTIFICIALLY RESTRICTED

N. Ye. Panferova and V. I. Pervushin *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 41-44 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 32-35

Avail: NTIS HC A07/MF A01

During a prolonged exposure to an altitude chamber (37 to 120 days), man's motor activity decreases 3- or 4-fold: from 15 to 19 thousand, to 2 to 4 thousand steps per day. During a prolonged restraint in a chair in the position of an average physiological rest the number of movements falls to 5 to 7 per hour. The change of motor activity during hypodynamics and recovery follows three stages: an acute change; a slow change; and a stage of stabilization at a new level. It is shown that the people who find themselves in an environment limiting their physical activity do not have the need for an additional workload. Author

N81-28707# Joint Publications Research Service, Arlington, Va.

MORPHOLOGICAL CHANGES IN DIFFERENT TYPES OF RAT MUSCLE FIBERS DURING LONG-TERM HYPOKINESIA

S. Kurash, A. Andzheyevska, and Ya. Gurski *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 45-52 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 35-41

Avail: NTIS HC A07/MF A01

Morphological changes in different type muscle fibers of rats kept for 30 days in small enclosures were investigated. The white muscle (the uppermost layer of the musculus vastus lateralis) showed the smallest changes. In the red muscle (the innermost layer of the m. vastus lateralis) the most significant changes were seen in contractile elements, which involved lesions in Z bands. The most hypokinesia-sensitive muscle was the m. soleus, an intermediate muscle, were degenerative and atrophic changes developed in most fibers and involved all structural elements. Author

N81-28708# Joint Publications Research Service, Arlington, Va.

CORTICOSTEROID CONTENT OF RAT ADRENALS IN THE PRESENCE OF HYPOKINESIA COMBINED WITH GRADED PHYSICAL EXERCISE

Ye. A. Zagorskaya *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 53-56 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 41-44

Avail: NTIS HC A07/MF A01

Data are presented on the content of corticosteroids in adrenals of rats exposed to 46, 53 and 60 day hypokinesia as well as 60 day hypokinesia combined with graded exercises. It was found that the content of corticosteroids in adrenals remained essentially unaltered after 46 day hypokinesia, decreased after 53 day hypokinesia and increased after 60 day hypokinesia as compared to the appropriate controls. The use of exercises demonstrated good reserve capabilities of the hypophyseal adrenal system of rats after 60 day hypokinesia and revealed certain changes in regulatory mechanisms of the hypophysis adrenal cortex system. Author

N81-28709# Joint Publications Research Service, Arlington, Va.

COMPARATIVE EFFICACY OF VARIOUS BIOLOGICALLY ACTIVE COMPOUNDS DURING EXERCISE

V. S. Shashkov and N. G. Lakota *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 57-65 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 44-51

Avail: NTIS HC A07/MF A01

Over 30 drugs and recipes were assessed in 440 provocative bicycle ergometry tests PWC 170 and individual tolerance (IT) tests in which 63 healthy volunteers participated. In the study the IT test was physiologically substantiated, and performance evaluation based on PWC 170, when heart rate influencing drugs were taken, was shown to be incorrect. In the course of normal and forced breathing (gas exchange measurements) quantitative variations of PWC170 were recorded. The combination of the

two tests, having criterion properties subjected to the rank evaluation, are recommended as a method for determining physical work capacity and testing drug efficiency. During an exposure to adverse environments or functional, humoral or integrative stresses the following drugs can be prescribed: drugs classified as adaptogens of the U.S.S.R. flora; multicomponent tonic recipes, containing aminoacids, metabolites, adaptogens, vitamins and metal compounds; recipes containing aminoacids and anabolics as well as low doses of central nervous system stimulants. S.F.

N81-28710# Joint Publications Research Service, Arlington, Va.

CHANGES IN ANIMAL REACTIVITY UNDER THE INFLUENCE OF PROLONGED ROTATION

N. I. Arlashchenko and A. A. Shipov *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 66-70 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 51-54

Avail: NTIS HC A07/MF A01

Rabbit experiments demonstrated that a prolonged (up to 14 days) rotation at a rate of 7 rpm in a 110 cm arm rotating system alters reactivity of the animal body as follows from measurements of radioresistance, vestibular reactivity, and barrier function of eye vessels, thus indicating increase in general resistance to environmental effects. Author

N81-28711# Joint Publications Research Service, Arlington, Va.

EFFECT OF SIMULATED GRAVITY ON THE CHICK EMBRYO MYOCARDIUM

S. S. Oganessian, R. A. Gevorkyan, T. S. Saminyan, and M. A. Eloyan *In its USSR Rept.: Space Biol. and Aerospace Med.*, v. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 71-75 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 54-57

Avail: NTIS HC A07/MF A01

Daily centrifugation of 5 to 8 day embryos at 7 G for 20 min by means of a specially designed attachment decreased the amplitude and increased the rate of rhythmic activity of ventricular myocytes, the automatic activity of atrial pacemakers remaining unaltered. These changes were accompanied by a decrease in Ca²⁺ sensitivity of myocytes. Daily centrifugation of 11 to 20 day chick embryos led to myocardial hypertrophy and increase in the diameter of myocardiocytes as well as to increase in the content of actin, troponin T and the second light chain of myosin, increase in the content of tropomyosin and emergence of the third light chain of myosin in the electrophoregrams. Changes in the composition of protein subunits of the contractile system are induced by activation of proteolytic enzymes in the muscle tissue. Author

N81-28712# Joint Publications Research Service, Arlington, Va.

RELATIONSHIP BETWEEN PULSED FILLING OF EARLOBE VESSELS AND CARDIAC EXTRASYSTOLE DURING HEAD-PELVIS ACCELERATIONS AFTER EXPOSURE TO SIMULATED WEIGHTLESSNESS

I. F. Vilvilyams *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 76-79 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 57-60

Avail: NTIS HC A07/MF A01

The relationship between changes in the pulse blood filling of earlobe vessels and cardiac arrhythmias was studied in 91 manned experiments during which test subjects were exposed to simulated weightlessness and then to acceleration of +3 Gz for 5 min in a 7.25 m arm centrifuge. The vascular type of functional decompensation may transform into the cardiac type in normal men during recovery from an exposure to +3 Gz and simulated weightlessness. S.F.

N81-28713# Joint Publications Research Service, Arlington, Va.

EXTERNAL RESPIRATION IN THE PRESENCE OF HYPERBARIC OXYGENATION

V. A. Glazkova and I. N. Chernyakov *In its USSR Rept.: Space Biol. and Aerospace Med.*, V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 80-84 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 60-64

Avail: NTIS HC A07/MF A01

The function of external respiration (measured by pneumo-

tachography, spirometry, diffusion perfusion ratios of the lungs) and acid base equilibrium in blood of men exposed to hyperbaric (up to 3 ata) hyperoxia for 5 to 6 hours is discussed. The above parameters remained unaltered. An inference is made that oxygenation can be used in aerospace medicine. Author

N81-28714# Joint Publications Research Service, Arlington, Va.

RESPIRATORY REACTIONS TO CHANGES IN GAS ENVIRONMENT DENSITY AT DIFFERENT RATES OF INSPIRATORY FLOW

I. S. Breslav, Ye. L. Kalacheva, E. A. Konza, and N. Z. Klyuyeva *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 85-89 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 64-67*

Avail: NTIS HC A07/MF A01

The effect of altered gas density on the respiratory function was investigated in relation to the velocity of gas flows in airways. In the normal man breathing of normoxic He-O₂ (with a density of 0.34 as compared to air) slightly decreased and inhalation of SF₆-O₂ (with a density of 4.2) significantly increased the metabolic rate of ventilation. These effects were distinct when inspiratory flows reached threshold values. In anesthetized cats, He-O₂ breathing reduced inspiratory activity upon forced respiration, and SF₆-O₂ breathing increased it upon quiet respiration. These findings are used to predict limiting densities of respiratory mixtures for a normal man performing physical work of a certain load undersea. Author

N81-28715# Joint Publications Research Service, Arlington, Va.

THE TOXIC EFFECT OF INSIGNIFICANT OXYGEN EXCESS IN AN ARTIFICIAL GAS ATMOSPHERE

P. M. Gramenitskiy, V. B. Malkin, L. K. Romanova, Ye. V. Loginova, N. A. Roshchina, and K. S. Yurova *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 90-96 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 67-72*

Avail: NTIS HC A07/MF A01

It was demonstrated that a 24 hour exposure of animals to an artificial atmosphere with PO₂ = 250 mm Hg caused lesions in the pulmonary structure which were most distinct in the surfactant system. It was found that after the exposure the animal tolerance to hyperbaric (4 atm) hyperoxic atmosphere was lowered. Author

N81-28716# Joint Publications Research Service, Arlington, Va.

RESULTS OF HEAT TRANSFER-1 EXPERIMENT CONDUCTED ABOARD THE COSMOS-936 BIOSATELLITE

L. Novak, L. Prokopova, A. M. Genin, and V. K. Golov *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 97-101 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 73-76*

Avail: NTIS HC A07/MF A01

The experiment Heat Exchange-1 confirmed the hypothesis about weightlessness-induced significant decrease of heat emission from a heated body into the environment at air ventilation rate near body surface below .1 msec. Author

N81-28717# Joint Publications Research Service, Arlington, Va.

A DEVICE FOR STUDYING THE TURNING REFLEX IN SMALL LABORATORY ANIMALS

G. S. Ayzikov, A. S. Markin, and I. Yu. Sarkisov *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 102-104 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 76-78*

Avail: NTIS HC A07/MF A01

A device was developed to make it possible to immobilize an animal reliably and for a long time in any position (including belly up), and to rapidly release it for a free fall from any initial position, with a nontraumatic landing. The device design and operation are discussed. S.F.

N81-28718# Joint Publications Research Service, Arlington, Va.

EFFECT OF IONIZED AIR ENVIRONMENT ON HUMAN HORMONAL SYSTEMS

R. A. Tigranyan, V. P. Savina, N. A. Davydova, and N. F. Kalita *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) p 105-109 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 78-81*

Avail: NTIS HC A07/MF A01

A 16 day stay of 4 subjects in a pressure chamber with an ionized air environment elected activation of the hormonal element in the adrenosympathetic (AS) system, increase in functional activity of the hypophysoadrenocortical system and stimulation of Beta-cells of the islets of Langerhans in the pancreas, and at the same time it had an inhibitory effect on the mediator element of the AS and hypophysis - thyroid systems. S.F.

N81-28719# Joint Publications Research Service, Arlington, Va.

STUDY OF MOUSE MORTALITY AFTER EXPOSURE TO HELIUM IONS WITH ADMINISTRATION OF TILORONE

B. S. Fedorenko, M. Ya. Talash, and Yu. D. Parfenov *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 110-112 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 81-82*

Avail: NTIS HC A07/MF A01

A comparative study was made of mortality rate of mice after exposure to helium ions and gamma rays under ordinary conditions and following preliminary administration of tilorone. Tilorone is an inducer of interferon, which has some effect on development of radiation lesions. The product also has a mild radioprotective action. Preadministration of tilorone did not reliably lower the postradiation death rate after delivery of helium ions in doses of 600, 700 and 800 rad. At the same time, administration of tilorone 18 h before irradiation shortened the animals' life span. It is concluded that preliminary administration of tilorone enhances the radiation lesion from helium ions. We observed greater effectiveness of helium ions, as compared to gamma rays. S.F.

N81-28720# Joint Publications Research Service, Arlington, Va.

SEASONAL CHANGES IN LEUKOCYTE COUNT AND PHAGOCYTIC ACTIVITY OF LEUKOCYTES IN INDIVIDUALS WORKING IN A CLOSED ENVIRONMENT

V. S. Novikov and A. M. Timofeyev *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 112-114 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 82-84*

Avail: NTIS HC A07/MF A01

A survey was made in the temperate climate zone of 43 operators ranging in age from 19 to 22 years, who worked in sealed-off rooms where ambient temperature ranged from 24 to 42 C and ambient (atmospheric) noise ranged from 87 to 103 dB. The subjects spent 8 h daily under these conditions. The control group (30 people) consisted of subjects in the same occupation, of the same age and with the same work tenure, but who worked under normal hygienic conditions. An increase in leukocyte count was demonstrated in people working in a closed environment, referable to the neutrophils and monocytes in the wintertime, and a reliable decline in the spring and summer. Similar seasonal changes were observed in the control group. There was a lower leukocyte count, due to reduction in number of neutrophils and monocytes, in the experimental group. The eosinophil content was higher in the experimental group at all tested times. S.F.

N81-28721# Joint Publications Research Service, Arlington, Va.

PERCEPTION OF INSTRUMENT DATA AS RELATED TO FLYING EXPERIENCE

V. V. Kniga *In its USSR Rept.: Space Biol. and Aerospace Med., V. 14, No. 6 (JPRS-77311) 4 Feb. 1981 p 115-119 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 14, no. 6, 1980 p 84-86*

Avail: NTIS HC A07/MF A01

The link was determined between evaluation of quality of perception and processing of instrument data under laboratory conditions and the pilots' experience in instrument flying. S.F.

N81-28722# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 15, NO. 2, MARCH - APRIL 1981

O. G. Gazenko, ed.: 8 May 1981 131 p refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981

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Biological effects, mainly of weightlessness and rotation in manned space flight, are discussed. Vision, hygiene, air quality, emotional well-being and biomedical training are included.

N81-28724# Joint Publications Research Service, Arlington, Va.

BIOMEDICAL TRAINING OF COSMONAUTS (HISTORY, CONTENT, STAGES, EVOLUTION AND TRENDS OF DEVELOPMENT)

G. F. Khlebnikov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 5-13 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 8-14*

Avail: NTIS HC A07/MF A01

Changes in the biomedical training of cosmonauts are discussed and the major tendencies of its improvements are described. S.F.

N81-28725# Joint Publications Research Service, Arlington, Va.

PSYCHOPHYSIOLOGICAL SCREENING: STATUS AND PROSPECTS

N. N. Gurovskiy and M. A. Novikov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 14-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 15-24*

Avail: NTIS HC A07/MF A01

The major stages in the development of psychophysiological selection of cosmonauts in the U.S.S.R. are discussed. The psychophysiological selection was originally based on the data of psychoneurological expertise of the flight personnel and achievements of aviation psychology in the U.S.S.R. This was followed by the development of psychophysiological research, using instrumentation and simulation flights. Further complication of flight programs and participation of nonpilot cosmonauts (engineers, scientists) necessitated detailed study of personality properties and application of personality tests. At the present stage in development of psychophysiological selection great importance is attached to biorhythmological selection and methods for studying man's capabilities to control his own emotional, behavioral and autonomic reactions as well as environmental parameters. Methods of group selection and problems of rational selection of space crews are discussed. Author

N81-28726# Joint Publications Research Service, Arlington, Va.

PREVENTION OF PSYCHOEMOTIONAL DISTURBANCES DURING LONG-TERM SPACE FLIGHTS BY MEANS OF PSYCHOLOGICAL SUPPORT

V. I. Myasnikov and O. P. Kozarenko *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 26-32 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 25-29*

Avail: NTIS HC A07/MF A01

A number of supportive and rehabilitative measures forming psychological support are used to prevent potential psychoemotional disorders in crewmembers during prolonged space missions. The use of these measures in the Salyut 6 Soyuz 96-185 day space flights has shown their efficiency in terms of expansion of the 'psychological living space' and maintenance of a high emotional and working tone of crewmembers. Author

N81-28727# Joint Publications Research Service, Arlington, Va.

CURRENT STATUS AND PROSPECTS OF HYGIENIC SUPPORT OF MANNED SPACE FLIGHTS

Yu. G. Nefedov and S. N. Zaloguyev *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 33-41 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2,*

Mar. - Apr. 1981 p 30-37

Avail: NTIS HC A07/MF A01

Results of investigations related to the hygienic maintenance of manned space flights are discussed. The major problems in this field that need to be resolved in order to maintain adequate environments in space cabins are reviewed. S.F.

N81-28728# Joint Publications Research Service, Arlington, Va.

OPTIMUM ATMOSPHERE IN PRESSURIZED CABINS AND FUTURE USE THEREOF

N. A. Agadzhanian *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 42-49 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 37-43*

Avail: NTIS HC A07/MF A01

Physiological validation of an artificial atmosphere in manned cabins of flying vehicles remains one of the major biomedical problems. It was experimentally demonstrated that oxygen and carbon dioxide are closely related in vital processes, acting as antagonists or synergists. Changing their content in an enclosure, it is possible to influence the function of the human body and to correct its deconditioning due to prolonged hypokinesia. Active mountain adaptation accompanied by a marked mobilization of physiological systems seems to train and activate functional reserves of the body, making them more adequate to tolerate extreme effects. Author

N81-28729# Joint Publications Research Service, Arlington, Va.

FITNESS OF HUMAN VISION WITH EXPOSURE TO VERY BRIGHT LIGHT

V. I. Kartsev *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 50-60 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med., v. 15, no. 2, Mar. - Apr. 1981 p 44-51*

Avail: NTIS HC A07/MF A01

Publications on visual reactions of man pre-exposed to the deadaptive effects of different light sources are reviewed. S.F.

N81-28730# Joint Publications Research Service, Arlington, Va.

BIOLOGICAL RESEARCH IN SPACE

M. G. Tairbekov and G. P. Parfenov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 61-71 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 51-60*

Avail: NTIS HC A07/MF A01

Investigations carried out during the last two decades on various biological objects - microorganisms, plant seeds, insects, higher and lower plants, fish and amphibians in real and simulation space flights are described. Current knowledge of the biological role of gravity and possible mechanisms of adaptation to weightlessness, as well as the suitability of different biological objects for further space studies, are discussed. Most experiments conducted in real space flights lent support to the theoretical studies of the level and limits of weightlessness effects upon biological systems. Analysis of the data obtained in space and ground bound experiments suggests that molecular processes are indifferent to an altered gravity and that energy metabolism plays an important role in adaptation of biological systems to zero g. S.F.

N81-28731# Joint Publications Research Service, Arlington, Va.

ANIMAL EXPERIMENTS ABOARD BIOSATELLITES OF THE COSMOS SERIES: RESULTS AND PROSPECTS

O. G. Gazenko, Ye. A. Ilin, V. S. Oganov, and L. V. Serova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 72-80 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 15, no. 2, Mar. - Apr. 1981 p 60-66*

Avail: NTIS HC A07/MF A01

Results of animal (rat) experiments carried out onboard biosatellites Cosmos-605-690, 782, 936 and 1129 are presented with emphasis on changes in metabolism and musculoskeletal system. The modifying effect of weightlessness on the animal radiosensitivity is considered. The use of artificial gravity as a

countermeasure against adverse effects of weightlessness is discussed. Primate experiments aimed at a detailed study of the mechanisms of weightlessness-induced changes in the structure and function of the cardiovascular, musculoskeletal and vestibular systems are described. Author

N81-28732# Joint Publications Research Service, Arlington, Va.

MORPHOLOGICAL EFFECTS OF WEIGHTLESSNESS AND PATHOGENESIS THEREOF

A. S. Kaplanskiy and Ye. A. Savina *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 81-89 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 66-72

Avail: NTIS HC A07/MF A01

Results of morphological and histochemical investigations of rats flown onboard the Soviet biological satellite of the Cosmos series are summarized. The changes in different functional systems and organs were found to be related. Hypotheses concerning the pathogenesis of the changes detected are included. It is emphasized that most changes are induced by a reduction of load upon the musculoskeletal system in weightlessness. S.F.

N81-28733# Joint Publications Research Service, Arlington, Va.

SOVIET RESEARCH ON ARTIFICIAL GRAVITY

A. R. Kotovskaya, R. R. Galle, and A. A. Shipov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 90-100 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 72-79

Avail: NTIS HC A07/MF A01

Biomedical investigations concerning artificial gravity performed so far in the USSR are reviewed. It is believed that the major task is to identify the minimum value of artificial gravity which may eliminate adverse effects of weightlessness on the human body. In ground-based investigations, high priority is given to the development of methods of increasing human tolerance to a rotating environment. Author

N81-28734# Joint Publications Research Service, Arlington, Va.

COSMONAUTICS AND DEVELOPMENT OF AVIATION MEDICINE

N. M. Rudnyy and A. A. Gyurdzhian *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, 1981 (JPRS-78028) 8 May 1981 p 101-106 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 79-84

Avail: NTIS HC A07/MF A01

Certain aspects of interaction between aviation and space medicine, contribution of aviation medicine into the development of space biology and medicine, and the role of cosmonautics in current achievements of aviation medicine are discussed. Advances in studies of space flight effects, development of life support and flight safety systems, medical and psychological support of the flight personnel, implementation of methods and techniques, electronics, computers and automatics are included. Particular importance is attached to the rapid development of ergonomic approaches to the design and application of technology, study of psychophysiology and psychology of human efficient activity in the system 'man-flying vehicle-environment,' i.e., psychophysiological ergonomics. Methodological and organizational aspects of the development of aviation and space medicine are briefly described. Author

N81-28735# Joint Publications Research Service, Arlington, Va.

CIRCADIAN BIORHYTHMS AND FLIGHT PLANNING

A. A. Yurchenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 107-111 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 84-87

Avail: NTIS HC A07/MF A01

It was shown that circadian rhythms of functional systems of the human body exert a noticeable effect on psychophysiology and reliability parameters of pilots and cadets which may be of special importance in flights on a shift basis. The dysbalance in work-rest cycles and circadian biorhythms decreases strongly

qualitative and quantitative indices of pilot activities. In some cases this causes erroneous actions, contingent situations and accidents. Author

N81-28736# Joint Publications Research Service, Arlington, Va.

A MODEL OF FORMATION OF NYSTAGMIC REACTIONS TO A SET OF CALORIC TESTS

M. M. Levashov and Ya. A. Bedrov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 112-119 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 87-92

Avail: NTIS HC A07/MF A01

The model furnishes additional information about the vestibular system, when evaluating caloric tests. The nystagmus intensity (the slow component rate during maximum intensity) is assumed to be proportional to the difference between energy levels (EL) of the right and left vestibular nuclear complexes (NC). EL of each NC is equal to the afferent flow (AF) plus its inherent activity (IA). During caloric (two warm and two cold) tests IA remains constant. AF at rest is equal to spontaneous activity of receptors and during stimulation it increases or decreases in a linear fashion. Parameters of the model are: difference between intensities of reactions to warm and cold tests, difference between EL of two (right and left) unstimulated NC, and ratio of nystagmus intensity to the stimulus for each labyrinth. S.F.

N81-28737# Joint Publications Research Service, Arlington, Va.

METHOD FOR CONCENTRATING TRACE IMPURITIES FROM THE ATMOSPHERE OF ISOLATED CHAMBERS BY MEANS OF COOLED TRAPS

T. V. Node, N. M. Vatulya, and O. A. Sukhorukov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 2, Mar. - Apr. 1981 (JPRS-78028) 8 May 1981 p 120-123 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 15, no. 2, Mar. - Apr. 1981 p 93-94

Avail: NTIS HC A07/MF A01

Questions of practical use of traps at low temperature for quantitative chromatographic analysis of trace contaminants present in the atmosphere of inhabited sealed spaces are discussed. S.F.

N81-28738# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences.

MODEL MANAGEMENT SYSTEMS: AN APPROACH TO DECISION SUPPORT IN COMPLEX ORGANIZATIONS

Joyce J. Elam, John C. Henderson, and Louis W. Miller 4 Aug. 1980 41 p refs

(Contract N00014-75-C-0440)

(AD-A089339) Avail: NTIS HC A03/MF A01 CSCL 05/1

A system designed to extend the traditional decision support system (DSS) concept to support the model management requirements of complex organizations is described. The system's objectives are to provide a mechanism to represent and to diffuse the organization knowledge about models so that the user community can utilize this knowledge to adapt or build decision aids. E.A.K.

N81-28739# California Univ., Berkeley. Lawrence Berkeley Lab.

EFFECTS ON BIOLOGICAL SYSTEMS OF REFLECTED LIGHT FROM A SATELLITE POWER SYSTEM

M. White Apr. 1981 55 p refs

(Contract W-7405-eng-48)

(NASA-CR-164586; DOE/ER-0100)

Avail: NTIS

HC A04/MF A01 CSCL 06C

Light reflection produced by the satellite power system and the possible effects of that light on the human eye, plants, and animals were studied. For the human eye, two cases of reflected light, might cause eye damage if viewed for too long. These cases are: (1) if, while in low Earth orbit, the orbital transfer vehicle is misaligned to reflect the Sun to Earth there exists a maximum safe fixation time for the naked eye of 42.4 sec; (2) reflection from the aluminum paint on the back of the orbital transfer vehicle, while in or near low Earth orbit, can be safely viewed by the naked eye for 129 sec. For plants and animals the intensity and timing of light are not a major problem. Ways for reducing and/or eliminating the irradiances are proposed. DOE

N81-28740* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

URINE COLLECTION APPARATUS

Roger B. Michaud, inventor (to NASA) (Martin Marietta Aerospace, Denver) 2 Jun. 1981 8 p Filed 27 Apr. 1979 Supersedes N79-23657 (17 - 14, p 1887) Sponsored by NASA (NASA-Case-MSC-18381-1; US-Patent-4,270,539; US-Patent-Appl-SN-034531; US-Patent-Class-128-295; US-Patent-Class-4-144.3) Avail: US Patent and Trademark Office CSCL 06B

A urine collection device for females comprises an interface body with an interface surface for engagement with the user's body. The interface body comprises a forward portion defining a urine-receiving bore which has an inlet in the interface surface adapted to be disposed in surrounding relation to the urethral opening of the user. The interface body also has a rear portion integrally adjoining the forward portion and a non-invasive vaginal seal on the interface surface for sealing the vagina of the user from communication with the urine-receiving bore. An absorbent pad is removably supported on the interface body and extends laterally therefrom. A garment for supporting the urine collection is also disclosed.

Official Gazette of the U.S. Patent and Trademark Office

N81-28741 British Library Lending Div. Boston Spa (England). **IMPAIRMENT OF PERFORMANCE BY ALCOHOL AND DIAZEPAM**

J. Lutze Feb. 1981 17 p refs Transl. into ENGLISH from Zeitschrift fuer Rechtsmedizin (West Germany), v. 82, no. 4, 179 p 327-336 (BLL-RTS-12193)

The effect of the intake of diazepam and alcohol on simple performance tests was investigated. The combined administration of diazepam and alcohol led to an increase of the plasma diazepam concentration as compared to that obtained after diazepam without alcohol. Furthermore, after combined intake of diazepam and alcohol a decrease of performance was observed, that uses significantly higher, than the effects obtained after either alcohol or diazepam alone. The impairment uses especially noticeable during the first hour of the experiment, i.e., until the plateau of the diazepam plasma concentration and impairment of performance could not be established. E.A.K.

N81-28742 Princeton Univ., N. J. **ELECTRONIC SPIN TUNNELING IN THE BINDING OF CARBON MONOXIDE TO HEMOGLOBIN** Ph.D. Thesis

Bernard Scott Gerstman 1981 174 p Avail: Univ. Microfilms Order No. 8114619

A nonadiabatic quantum tunneling process, a mechanism for effecting the electronic spin change of the hemoglobin's iron upon the binding of carbon monoxide was investigated. The Born-Oppenheimer approximation is used to separate the recombination of the CO to the iron in the heme at low temperatures into a nuclear tunneling and an electronic tunneling. The crystal field of the heme determines the L-quantization axis in each local heme coordinate system. Hemoglobin has a strong absorption band at 436 nm when CO is bound. This absorption is orientation dependent for the absorption is predominantly for light polarized in the plane, of the dish-like heme inside the hemoglobin molecule. The CO molecules bound to hemoglobin molecules in a sample are photodissociated by an intense laser pulse in the presence of a magnetic field. As the CO molecules recombine with the hemoglobin the optical dichroism of the sample is monitored. Theory behind the magnetic field dependence is investigated and results of a magnetic field dependence to the recombination rate are presented. Dissert. Abstr.

N81-28743# Cornell Univ., Ithaca, N. Y. College of Agriculture and Life Sciences.

INSTRUMENTATION AND SOFTWARE FOR THE COLLECTION, ANALYSIS, AND INTERPRETATION OF EYE MOVEMENT DATA DURING READING Technical Report, 1 Mar. 1980 - 31 May 1981

Rafael Hirschfeld and George Bieger Jun. 1981 27 p refs (Contract N00014-80-C-0372; RR0420602) (AD-A100495; RR-4-SER-B; TR-3) Avail: NTIS HC A03/MF A01 CSCL 05/10

This report describes a method and apparatus for collecting and interpreting eye movement data, for research on reading pictures as well as text, that is both relatively inexpensive and portable. The report lists and describes hardware and software components of a data collection and data analysis system which provides precise information regarding the location, duration, and sequence of eye fixations during the reading of materials

that are composed of both text and pictures. A procedure for collecting eye-movement data in non-laboratory settings such as classrooms is also described. Author (GRA)

N81-28744# Wisconsin Univ. - Madison. Mathematics Research Center.

LOCAL EXISTENCE FOR THE CAUCHY PROBLEM OF A REACTION-DIFFUSION SYSTEM WITH DISCONTINUOUS NONLINEARITY Technical Summary Report

David Terman May 1981 27 p refs (Contract DAAG29-80-C-0041; Grant NSF MCS-80-17158) (AD-A100564; MRC-TSR-2221) Avail: NTIS HC A03/MF A01 CSCL 12/1

The most famous model for nerve conduction is due to Hodgkin and Huxley. However, a mathematical analysis of their model has proven very difficult. The complexity of the Hodgkin and Huxley model has led a number of other authors to introduce simpler models. In this report, we consider one such simplification. It has been demonstrated (experimentally) that impulses in the nerve axon travel with constant shape and velocity. Mathematically, this corresponds to traveling wave solutions. A number of authors have proven that the mathematical equations considered here do possess traveling wave solutions. Another property of impulses in the nerve axon is the existence of a threshold phenomenon. This corresponds to the biological fact that a minimum stimulus is needed to trigger an impulse. Here we prove some preliminary results which will be used in a later report when it is demonstrated that the equations under study do indeed exhibit a threshold phenomenon. GRA

N81-28745# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

PROGRAMMED CONTROL OF OPTICAL GRATING SCALES FOR VISUAL RESEARCH M.S. Thesis

Kenneth L. Martindale Dec. 1980 61 p refs (AD-A100792; AFIT/GE/EE/80D-29) Avail: NTIS HC A04/MF A01 CSCL 14/2

This report documents the design of a microprocessor based device which controls the brightness and contrast levels of video signals to be used by scientists in vision research to control laboratory monitors. Contrast control in a standard CRT monitor is obtained through the use of a commercial video chip linear circuit, and brightness control via a straight forward transistor amplifier. The transistor is inserted into the monitor's existing manual control circuit. The linear circuit and transistor are regulated by the microprocessor through digital-to-analog converters. A feedback network reports the actual brightness and contrast produced on the monitor's screen. This network is comprised of a 1024 element photodiode array and an analog-to-digital converter. The photodiode array measures the luminance directly off the monitor and the analog-to-digital converter digitizes the information for use by the microprocessor. The report also contains the results of an investigation into the use of digitally generated video and color monitors for vision research. GRA

N81-28746# Rochester Univ., N. Y. Div. of Toxicology. **URINARY METALLOTHIONEIN AS A BIOLOGICAL INDICATOR OF OCCUPATIONAL CADMIUM EXPOSURE**

Chiharu Tohyama, Zahir A. Shaikh, Kenneth J. Ellis (Brookhaven National Lab.), and Stanton H. Cohn (Brookhaven National Lab.) 1981 9 p refs Presented at 3rd Intern. Cadmium Conf., Miami, Fla., 3 Feb. 1981 Sponsored in part by International Lead Zinc Research Organization (Contract DE-AC02-76CH-00016; Grants NIEHS-ES01247; NIEHS-ES01248)

(BNL-29084; CONF-810238-1) Avail: NTIS HC A02/MF A01

Radioimmunoassay and neutron activation data indicate that the urinary metallothionein concentration is related to the liver Cd concentration in occupational Cd exposure. It is also related to the kidney Cd content, but only before the onset of renal dysfunction. A dose-response relationship, may be useful in minimizing the hazard of Cd-induced renal dysfunction. DOE

N81-28747# Florida State Univ., Tallahassee. **DAMAGING EFFECTS OF VISIBLE LIGHT. COMPREHENSIVE REPORT** Progress Report

1981 26 p refs (Contract DE-AC05-78OR-06021) (DOE/OR-06021/T1) Avail: NTIS HC A03/MF A01

Retinal light damage was studied. A myriad of variables effect the production of light damage. These include age, prior

light history, body temperature, vitamin A status, intensity, wavelength and duration of light. The intensity-duration function and the age function were studied in detail in rats. DOE

N81-28748* Brandeis Univ., Waltham, Mass. Dept. of Psychology.
VESTIBULAR SELECTION CRITERIA DEVELOPMENT Quarterly Progress Report, 1 Jun. 1980 - 1 Apr. 1981
 James R. Lackner 1 Jun. 1981 11 p refs
 (Contract NAS9-15147)
 (NASA-CR-161044) Avail: NTIS HC A02/MF A01 CSCL 05J

The experimental elicitation of motion sickness using a short arm centrifuge or a rotating chair surrounded by a striped cylindrical enclosure failed to reveal any systematic group or consistent individual relationship between changes in heart rate, blood pressure, and body temperature and the appearance of symptoms of motion sickness. A study of the influence of vision on susceptibility to motion sickness during sudden stop simulation shows that having the eyes open during any part of the sudden stop assessment is more stressful than having them closed throughout the test. Subjects were found to be highly susceptible to motion sickness when tested in free fall and in high force phases of flight. The effect of touch and pressure cues on body orientation during rotation and in parabolic flight are considered as sensory as well as motor adaptation. A.R.H.

N81-28749# Air Command and Staff Coll., Maxwell AFB, Ala.
NEW TRAINING REALISM FOR B-52 CREWS
 Bruce E. Eickhoff May 1981 25 p refs
 (AD-A100571; ACSC-0780-81) Avail: NTIS
 HC A02/MF A01 CSCL 05/9

Increasing defensive capabilities of potential enemies have required significant changes in the Strategic Air Command's mission and training philosophy since the mid-1970s. Specifically, the command has stepped up B-52 participation in a variety of exercises to improve readiness in both the nuclear and non-nuclear missions. The article discusses the SAC training program in some detail to show how changes in philosophy insure that the aging B-52 will be a viable weapon system during the 1980s. GRA

N81-28750* Georgia Inst. of Tech., Atlanta. School of Textile Engineering.
DEVELOPMENT OF MOLDED, COATED FABRIC JOINTS: FABRIC CONSTRUCTION CRITERIA FOR: A SPACESUIT ELBOW JOINT Status Report, period ending Aug. 1981
 L. Howard Olson Aug. 1981 19 p refs
 (Grant NsG-2356)
 (NASA-CR-164829) Avail: NTIS HC A02/MF A01 CSCL 06K

The design and fabrication of a molded, coated fabric elbow joint capable of operating reliably at 8 psi internal pressure for extended periods of flexure is considered. The overall design of the joint includes: (1) selection of heatsettable fiber of sufficient strengths; (2) choosing an optimum fabric construction; (3) a fatigue resistant; flexible coating; and (4) a molding technique. A polyester yarn of type 56 Dacron and a urethane coating system were selected. The relationships between yarn and weave parameters which lead to an optimum fabric construction for the 8 psi elbow joint are defined. A.R.H.

N81-28751# Human Engineering Labs., Aberdeen Proving Ground, Md.
AN INVESTIGATION OF THE EFFECTS OF THE DH-132 HELMET SUSPENSION SYSTEM UPON PERCEIVED HELMET WEIGHT UNDER STATIC CONDUCTIONS Final Report
 R. Bradley Randall Apr. 1981 12 p refs
 (AD-A100392; HEL-TN-3-81) Avail: NTIS HC A02/MF A01 CSCL 05/5

The effects of the Standard 'A' DH-132 Combat Vehicle Crewmember (CVC) helmet suspension system upon perceived helmet weight were investigated. Twenty-three test participants were used in the experiment which evaluated their ability to judge helmet weight relative to a 62-ounce standard over a range of 42 through 82 ounces. A relatively narrow range of indecision--reference weight plus and minus 6-1/4 ounces--indicated that the CVC type of helmet suspension system made the wearer sensitive to relatively minor changes in helmet weight. Author (GRA)

N81-28752# Technology Service Corp., Santa Monica, Calif.
MULTISTATION VOICE DATA ENTRY CONFIGURATION

STUDY Final Technical Report, Jan. - Oct. 180

Peter W. Gregory and J. Michael Reaves Apr. 1981 144 p refs
 (Contract F30602-80-C-0033; AF Proj. 4303)
 (AD-A100470; TSC-PD-8662-1; RADC-TR-81-50) Avail: NTIS
 HC A07/MF A01 CSCL 05/8

This report describes a study to configure a multiple-station voice data entry (VDE) system for application to the Digital Landmass System (DLMS) data base at the Defense Mapping Agency's Aerospace Center (DMAAC) in St. Louis, Missouri. Study results are based on a thorough analysis of the DLMS data entry process and the analysts' environment, including a detailed questionnaire completed by over 80 analysts. Available equipment for voice data entry and response was surveyed extensively and tabulated results are presented. An operational scenario for VDE is developed, following a detailed functional description of DLMS data entry requirements. Both highly centralized and fully distributed configurations meet system requirements. Interactive, on-line data entry by keyboard is due to be implemented at DMAAC with IFASS (Interactive Feature Analysis Support System). This and other advanced systems being actively sought by DMA will substantially change the analysts' data entry procedures. We therefore recommend that VDE be reevaluated with respect to specific hardware cost/performance trade-offs after IFASS is implemented and in light of the rapid advancements being made in speech recognition and voice response technology. GRA

N81-28753# Little (Arthur D.), Inc., Cambridge, Mass.
A 10-ZONE THERMAL MANIKIN FOR EVALUATION PERSONNEL PROTECTIVE GARMENTS IN COLD/AIR AND WATER IMMERSION ENVIRONMENTS Final Report
 David L. Richardson and Norman F. Audet Natick, Mass. Navy Clothing and Textile Research Facility Apr. 1981 14 p refs
 Presented at the Ann. Winter Meeting of ASME, Chicago, 16-21 Nov. 1980
 (Contract N00140-79-C-6017)

(AD-A100397; NCTRF-TR-142; NCTRF-7-80) Avail: NTIS
 HC A02/MF A01 CSCL 14/2

A thermal manikin with the dimensions and weight of a fiftieth percentile standing man simulates metabolic heat and will be used for evaluating the thermal protection capability of clothing and diving suits in cold air and/or water environments. The manikin has 10 independently heated and controlled sections made from aluminum castings. Power for each section is controlled by the temperature level of the torso and by temperature differences between adjacent sections. The manikin is water tight at a depth of 3m without internal pressurization. A pressure equalization system permits evaluation of protective clothing in water environments equivalent to submersion in 300 m of sea water. An automatic control and data acquisition system computes individual temperatures from thermistor sensors, average section temperatures, section and total power, and both section and total insulation (in units of clo) of the garment being tested. Author (GRA)

N81-28754# Naval Ocean Systems Center, San Diego, Calif.
REMOTE OPERATOR PERFORMANCE USING BANDWIDTH-LIMITED TV DISPLAYS: A REVIEW AND PROPOSAL Technical Document, Jan. - Aug. 1980

R. E. Cole (Hawaii Univ.) and B. H. Kishimoto Aug. 1980 21 p refs
 (AD-A100438; NOSC/TD-379) Avail: NTIS
 HC A02/MF A01 CSCL 05/8

This report is part of the overall effort to improve remote operator performance in a work and recovery system by optimizing the viewing system. It features (1) a detailed analysis of remote viewing systems and the problems encountered in their assessment; (2) a literature review of the effect of viewing systems limitations on remote vehicle operation, including limited bandwidth, number of cameras and time delay; and (3) a proposed set of experiments to determine the effects on operator performance of three bandwidth compression variables applied either singly or in combination with the operator selecting the levels that maximize performance. Author (GRA)

N81-29727* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

APPARATUS AND PROCESS FOR MICROBIAL DETECTION AND ENUMERATION Patent Application

Judd R. Wilkins and David C. Grana, inventors (to NASA) Filed 19 Feb. 1981 12 p
 (NASA-Case-LAR-12709-1; US-Patent-Appl-SN-235796) Avail:

NTIS HC A02/MF A01 CSCL 06C

An apparatus and process for detecting and enumerating specific microorganisms from large volume samples containing numbers of the microorganisms is described. The large volume samples are filtered through a membrane filter to concentrate the microorganisms. The filter is positioned between two absorbent pads previously moistened with a growth medium for the microorganisms. A pair of electrodes are disposed against the filter and the pad-electrode-filter assembly is retained within a petri dish. A cover is positioned on the base of the petri dish and sealed at the edges by a parafilm seal prior to being electrically connected to a strip chart recorder. NASA

N81-29728* National Aeronautics and Space Administration. Pasadena Office, Calif.

ENHANCEMENT OF IN VITRO GUAYULE PROPAGATION Patent Application

M. N. Dastoor (JPL, California Inst. of Tech., Pasadena), W. W. Schubert (JPL, California Inst. of Tech., Pasadena), and G. R. Petersen, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Jun. 1981 22 p (Contract NAS7-100)

(NASA-Case-NPO-15213-1; US-Patent-Appl-SN-280153) Avail: NTIS HC A02/MF A01 CSCL 06C

The in vitro propagation of Guayule from a nutrient media containing Guayule tissue is stimulated by adding a substituted trialkyl amine bioinducing agent to the nutrient media. Selective or differential propagation of shoots or callus is obtained by varying the amounts of substituted trialkyl amine present in the nutrient media. The luxuriant growth provided may be processed for its poly isoprene content or may be transferred to a rooting media for production of whole plants as identical clones of the original tissue. Large numbers of Guayule plants having identical desirable properties such as high polyisoprene levels can be produced. NASA

N81-29729* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE CHANGES IN LEAF REFLECTANCE OF SUGAR MAPLE SEEDLINGS (ACER SACCHARUM MARSH) IN RESPONSE TO HEAVY METAL STRESS

M. R. Schwaller, C. C. Schnetzler, and P. E. Marshall (Michigan Univ., Ann Arbor) Jun. 1981 17 p refs (NASA-TM-82150) Avail: NTIS HC A02/MF A01 CSCL 06C

The effects of heavy metal stress on leaf reflectance of sugar maple seedlings (*Acer saccharum* Marsh) are examined. It is found that sugar maple seedlings treated with anomalous amounts of heavy metals in the rooting medium exhibited an increased leaf reflectance over the entire range of investigated wavelengths, from 475 to 1650 nm. These results conform to those of a previous investigation in the wavelengths from 475 to 660nm, but tend to contradict the previous study in the near infrared wavelengths from 1000 to 1650nm. The differences may possible be due to different water regimes in the two investigations. M.G.

N81-29730* Purdue Univ., Fort Wayne, Ind. **THE TERATOGENIC EFFECTS OF THE FUEL JP-10 ON THE ICR MICE Final Report**

Robert D. Lyng 31 Mar. 1981 8 p refs (Grant AF-AFOSR-0093-80; AF Proj. 2312)

(AD-A101062; AFOSR-81-0541TR)

Avail: NTIS

HC A02/MF A01 CSCL 06/2

JP-10 is a synthesized fuel for Cruise Missiles. It is the exoisomer of 4, 7-methano-1H-indene, octahydro-12a alpha, 4 alpha, 7 alpha, 7a alpha, (CA 2825-83-4). Pregnant ICR mice were given oral doses of 0.2, 0.4, 0.6 and 0.8 ml/kg on days 6 through 9 of gestation. No significant differences were found between controls and experimental groups in mean implants/female, mean viable fetuses/litter, mean resorptions/litter, frequency of resorptions, frequency of soft tissue anomalies and frequency of skeletal anomalies. Mean fetal weight was significantly heavier in the 0.2 and 0.4 ml/kg groups. This effect is difficult to explain when the 0.6 and 0.8 ml/kg groups showed no increase in fetal weight. Author (GRA)

N81-29731* Dynatech R/D Co., Cambridge, Mass. **FEASIBILITY STUDY FOR ANAEROBIC DIGESTION OF AGRICULTURAL CROP RESIDUES, 1980 UPDATE Final Report**

Constance E. West and Edward Ashare Mar. 1981 170 p refs

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042) (SERI/TR-98175-1) Avail: NTIS HC A08/MF A01

Engineering economic analyses were performed for digestion of corn stover for small farm cooperative and industrial scales. The small farm scale processed the residue from an average size U.S. farm (400 acres); and the other sizes were two and three orders of magnitude greater. The results of the analyses indicate that production of fuel gas from corn stover is, at least, marginally economically feasible for both continuous and batch digestion processes. A sensitivity analysis was performed to assess which parameters significantly affect system economics. It was found that a credit for digester effluent would yield economically feasible process. DOE

N81-29732* Los Alamos Scientific Lab., N. Mex.

LACK OF EFFECT OF 60-HERTZ FIELDS ON GROWTH OF CULTURED MAMMALIAN CELLS

R. A. Tobey, Harold J. Price, Larry D. Scott, and Kenneth D. Ley May 1981 9 p refs

(LA-8831-MS) Avail: NTIS HC A02/MF A01

An initial series of studies carried out with a vessel which permitted reduction in growth rate. Because of suspicions that the effects on growth were due to something other than the 60-Hz field, the initial chamber was examined for generation of arcing and coronal effects, and a modified chamber yielding the same order of magnitude of 60-Hz field, but free of electrical artifacts, was utilized for growth studies. The results obtained demonstrated that the effects on growth observed with the initial chamber did not result from the electric field, but instead appeared to be attributable to arcing and coronal effects. DOE

N81-29733* Stanford Univ., Calif. Dept. of Civil Engineering. **HEAT TREATMENT OF ORGANICS FOR INCREASING ANAEROBIC BIODEGRADABILITY Annual Progress Report, 17 Jun. 1979 - 31 Aug. 1980**

P. J. Colberg, K. Baugh, T. Everhart, A. Bachmann, D. Harrison, L. Y. Young, and P. L. McCarty Mar. 1981 101 p refs Sponsored in part by Solar Energy Research Inst.

(Contract EG-77-C-01-4042)

(SERI/TR-98174-1) Avail: NTIS HC A08/MF A01

The objective of this study is to develop an understanding of pretreatment methods which are applicable to many potential organic materials of interest. The aim of pretreatment is to convert natural organic materials into less complex substrates which are more readily biodegradable by methane producing organisms. The results will be an increase in the yield of methane from a given quantity of material and at the same time a reduction in the quantity of residual organics requiring further costly processing and final disposal. This report describes the results of the final year's effort of this 3 year program. The autohydrolysis process has been selected as the most promising option from among several potential processes, and much of the work has focused on improving understanding of this process. DOE

N81-29734* California Univ., Berkeley. Lawrence Berkeley Lab. Biology and Medicine Div.

CATARACT PRODUCTION IN MICE BY HEAVY CHARGED PARTICLES

E. John Ainsworth, Ule Jose, Vivian V. Yang, and Mary E. Barker Mar. 1981 46 p refs Sponsored in part by NASA

(Contract W-7405-eng-48)

(NASA-CR-164599; LBL-12654)

Avail: NTIS

HC A03/MF A01 CSCL 06C

The cataractogenic effects of heavy charged particles are evaluated in mice in relation to dose and ionization density. The relative biological effectiveness in relation to linear energy transfer for various particles is considered. Results indicated that low single doses (5 to 20 rad) of Fe 56 or Ar 40 particles are cataractogenic at 11 to 18 months after irradiation; onset and density of the opacification are dose related and cataract density (grade) at 9, 11, 13, and 16 months after irradiation shows partial linear energy transfer dependence. The severity of cataracts is reduced significantly when 417 rad of Co 60 gamma radiation is given in 24 weekly 17 rad fractions compared to giving this radiation as a single dose, but cataract severity is not reduced by fractionation of C12 doses over 24 weeks. DOE

N81-29735* Naval Medical Research Inst., Bethesda, Md. **INDEX OF PUBLICATIONS ON BIOLOGICAL EFFECTS OF**

ELECTROMAGNETIC (RADIATION (0-100)GHZ)

James B. Kinn (EPA, Research Triangle Park, N.C.) and Elliot Postow Feb. 1981 575 p refs
(PB81-181430; EPA/600-9-81/011) Avail: NTIS
HC A24/MF A01 CSCL 06R

The contents were compiled from the data bases of the U.S. Environmental Protection Agency and the Navy Department. The bibliography covers the published work that was available to March 1980. GRA

N81-29736# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE VOL. 15, NO. 3, MAY - JUNE 1981

13 Jul. 1981 158 p refs Transl. into ENGLISH of various Russian journal articles
(JPRS-78499) Copyright. Avail: NTIS HC A08/MF A01

The effects of stress from various causes on physiological processes of humans and animals are examined as well as methods for measuring and modeling the systems involved and the changes observed after long and short term exposure. Altitude acclimatization, toxic reactions, radiation effects, and psychological factors affecting human performance are considered.

N81-29737# Joint Publications Research Service, Arlington, Va.

APPLICATION OF MATHEMATICAL MODELING TO ANALYSIS OF IMMUNOLOGICAL PHENOMENA

V. N. Krutko *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 1-15 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 4-14

Copyright. Avail: NTIS HC A08/MF A01

Mathematical models of immunological processes are reviewed with emphasis on reactions of the total immunity system and its single formations such as infectious diseases, in vivo experiments with cell cultures, cell proliferation and differentiation in the thymus, primary and secondary immune responses to the antigen, and immunodeficient states. Models of immunological reactions in vitro (precipitation, agglutination, plaque formation) are included. The potentialities of mathematical models of biological processes are examined. A.R.H.

N81-29738# Joint Publications Research Service, Arlington, Va.

STATUS OF COSMONAUT BIFIDOFLORA BEFORE AND AFTER SPACE FLIGHTS

G. I. Goncharova, N. N. Lizko, A. M. Lyannaya, V. M. Shilov, T. I. Spitsa, G. D. Syrykh, and V. A. Kazantsev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 16-21 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 14-18

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The bifidoflora in eight cosmonauts before and after space flights of varying duration were examined. The prelaunch quantity of bifidobacteria decreased drastically. In space flights of 30 days and longer, the level of acid formation by bifidoflora was reduced while the species composition remained the same. The most typical intestinal species of bifidobacteria were *B. longum* and *B. adolescentis*. Author

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RESULTS OF STUDIES OF HEMODYNAMICS AND PHASE STRUCTURE OF THE CARDIAC CYCLE DURING FUNCTIONAL TEST WITH GRADED EXERCISE DURING 140-DAY FLIGHT ABOARD THE SALYUT-6 STATION

A. D. Yagorov, O. G. Itsekhovskiy, A. P. Polyakova, V. F. Turchaninova, I. V. Alferova, V. G. Saveleyeva, M. V. Domracheva, T. V. Batenchuk-Tusko, V. G. Doroshev, and Ye. A. Kobzev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 22-27 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 18-22

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During the 140-day flight of the orbital station Salyut-6

two primary crew members performed 5 exercise tests on a bicycle ergometer at a load of 750 kg-m/min for 5 min. During tests heart rate, and before and after tests arterial pressure, left ventricular chronograms and cardiac output (rheographically) were recorded. In comparison to the preflight tests, the flight tests were characterized by less expressed changes in phasic parameters, moderate increase in cardiac output and, occasionally, insufficient decrease in peripheral resistance. These changes can be attributed to the weightlessness associated deficiency of the circulating blood volume. Author

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DISTINCTIONS REFERABLE TO SLEEP, CIRCADIAN RHYTHM OF PHYSIOLOGICAL FUNCTIONS AND PARAMETERS OF MAN'S PERFORMANCE ON THE FIRST DAY AFTER CHANGING FROM THE USUAL SCHEDULE TO SPLIT PERIODS OF ALTERNATE SLEEP AND WAKEFULNESS

A. N. Litsov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 28-33 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 22-25

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The effects of sectionated and shifted work rest cycles on diurnal variations of physiological functions, mental performance and sleep parameters have been studied. It is demonstrated that the first day on sectionated work rest cycles brings about the least changes. It is concluded that the sectionated work rest cycles can be recommended for transitional based schedules of scientists working in an unusual environment. Author

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EMOTIONAL REACTIONS OF OPERATORS AND SLOW WAVES OF CARDIAC RHYTHM

A. N. Karpov and L. A. Kinovyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 34-37 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 26-28

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Simulation studies of various emotional reactions of operators show that sthenic emotional reactions induce inhibition of slow waves of cardiac rhythm ($f = 0.05$ divided by 0.17 Hz), whereas asthenic emotional reactions lead to excitation of slow waves in the above frequency range. Author

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DYNAMIC STRUCTURE OF CARDIAC RHYTHM DURING ADAPTATION TO ALTITUDE HYPOXIA

F. A. Shukurov and I. G. Nidekker *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 38-42 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 28-31

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On the basis of dynamic series of RR intervals of electrocardiograms of healthy male test subjects exposed for a different period of time to high altitude hypoxia, autoregression clouds were built. The patterns of distribution thus obtained were compared with physical work capacity of the test subjects. It is suggested that when selecting people to work actively at high altitudes autoregression clouds can be used as quantitative estimates of their health state and as predictions of potential adaptation failures. Author

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MATHEMATICAL MODELING OF HUMAN CARDIOVASCULAR SYSTEM REACTIONS DURING POSTURAL AND EXERCISE TESTS

I. V. Arsenyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 43-47 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun.

1981 p 31-34

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A mathematical model of the human cardiovascular system is presented which consists of 34 compartments that represent arterial and venous subsystems of the systemic and pulmonary circulation, arterio venous capillaries; right and left ventricles; and atria of the heart. The model describes pulsating blood flows, changes in the pressures and volumes during a cardiac cycle in each compartment. The model was used to study cardiovascular reactions to exercises and to determine efficiency of different compensatory reactions to postural tests. A.R.H.

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MORPHOLOGICAL AND FUNCTIONAL EVALUATION OF THE EXTERNAL RESPIRATORY SYSTEM OF RABBITS WITH SUBACUTE OXYGEN TOXICITY

I. A. Aleksandrov, A. I. Selivra, T. Ye. Timoshenko, N. A. Ryabukha, V. A. Leosko, and A. G. Bobkov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 48-52 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. v. 15, no. 3, May-Jun. 1981 p 34-37*

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Rabbits were exposed to hyperoxic experiments (2.5-3.0 kg/sq cm O₂ for 3-4 h and 2.0 kg/sq cm O₂ for 16-22 h until death) to study changes in their respiratory and cardiovascular systems. After exposure, one lung was used for histological examinations under light microscope and the other to determine the surfactant stability index. It was found that serious changes in the respiratory and cardiovascular systems in all animals (including those who died during exposure) were not followed by histological changes of the lungs. Therefore, the pathogenetic mechanisms of subacute (pulmonary) oxygen intoxication are associated with disorders in the central regulation of automation functions rather than with direct lesions of the pulmonary tissue. Author

N81-29745# Joint Publications Research Service, Arlington, Va.

STRUCTURAL CHANGES IN THE SOLEUS MUSCLE OF RATS FLOWN ABOARD THE COSMOS SERIES OF BIOSATELLITES AND SUBMITTED TO HYPOKINESIA

Ye. I. Ilina-Kakuyeva and V. V. Portugalov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 53-57 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 37-40*

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The soleus muscles of rats used in flight and synchronous experiments of the Cosmos program and changes hypokinetic studies were examined. It is hypothesized that focal edema and dystrophic changes observed in flight, synchronous and hypokinetic rats can be caused by circulation disorders of different etiology. In flight and synchronous rats changes develop two days postflight due to the deconditioning of the muscle tissue and intraorgan vascular system which fail to meet the requirements after transition from 0 g to 1 g. In hypokinetic rats, circulation disorders occur on the first experimental day due to mechanical causes (paws are pressed against the cage floor impeding venous outflow) and muscle pump deficiency. In all cases, circulation disorders seem to be associated with peculiar features of angioarchitectonics of the soleus muscle. A.R.H.

N81-29746# Joint Publications Research Service, Arlington, Va.

ULTRASTRUCTURE OF THE RAT'S SMALL INTESTINAL MUCOSA AFTER FLIGHT ABOARD THE COSMOS-936 BIOSATELLITE

N. D. Yakovleva, N. A. Pogudina, and R. A. Brodskiy *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 58-64 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1980 p 40-45*

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The mucous membrane of the small intestine midportion of rats from the flight (weightless and centrifuged), synchronous, and vavarium groups was examined electron microscopically.

Ultrastructural changes were seen in all experimental groups, although their level and rate of recovery were different. Artificial gravity on Cosmos-936 did not influence those changes significantly. The data obtained suggest that the above changes are morphological manifestations of the reaction of rat small intestine to the combined effects of space flight factors. Author

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CATECHOLAMINES AND ENZYMES OF THEIR METABOLISM IN THE RATE MYOCARDIUM FOLLOWING A LONG-TERM SPACE FLIGHT

R. Kvetnyanski and R. A. Tigranyan *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 65-67 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 45-47*

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The concentration of catecholamines and activity of enzymes involved in their synthesis and degradation, i.e., dopamine-Beta-hydroxylase, monoamine oxidase and catechol-O-methyl transferase, were measured in the myocardium of rats flown for 19.5 days aboard Cosmos-782 and used in the synchronous and vivarium experiments. The animals were decapitated either immediately or 26 days after completion of the experiments. The catecholamine concentration and heart mass of flight animals increased significantly whereas enzyme activity remained unchanged. It can be concluded that in space flight the concentration of catecholamines in the heart increases, exerting no effect on their synthesis or degradation. Author

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DEHYDROGENASE ACTIVITY IN THE PENTOSE PHOSPHATE OXIDATIVE PATHWAY AND RELATION THEREOF TO LIPID METABOLISM UNDER HYPOKINETIC CONDITIONS

T. M. Lobova and P. P. Potapov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 68-72 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 47-50*

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Experiments were carried out on 84 white rats. At the beginning of hypokinesia, activity of glucose-6-phosphate and 6-phosphogluconate dehydrogenases in the adipose tissue was decreased and in the liver, skeletal muscles and heart increased. On the 30th hypokinetic day, the enzyme activity was nearly normal. Th dehydrogenase activity increased by the 60th hypokinetic day in the adipose tissue and by the 90th day in the liver and heart, whereas in skeletal muscles it decreased at that experimental stage. After completion of hypokinesia, the enzyme activity increased. Possible relationship between these changes in the enzyme activity and disorders of lipid metabolism during hypokinesia is discussed. Author

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USE OF SOME NUTRIENTS FROM INEDIBLE PLANT SOURCES AS FOOD

V. I. Fofanov, I. A. Abakumova, T. S. Guryeva, N. A. Tresvyatskaya, M. V. Markaryan, T. A. Smirnova, and N. Ye. Panferova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 73-77 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 50-53*

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Chemical composition and biological value of nutrient substances, particularly proteins, isolated from vegetable wastes are examined. Substances obtained from higher plant wastes can be used in nutrition. S.F.

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SOME BIOCHEMICAL PARAMETERS OF HEALTHY MAN IN A SEALED CHAMBER WITH PERIODIC IONIZATION OF AIR

B. V. Anisimov, Ye. A. Zagorskaya, I. I. Lyubarskaya, and I. A. Popova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 78-81 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 54-56

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The content of 11-hydroxycorticosteroids, triglycerides and enzyme activity in blood as well as the content of 17-ketosteroids in urine of normal men kept for 16 days in an enclosure ventilated for 24-60 hours with bipolar ionized air were measured. On DD 7-9 concentrations of 11-HOCS, triglycerides and 17-KS increased. This is attributed to an activation of the hypophyseal-adrenal system in response to the enclosure effect. Further rapid return of the parameters to the normal may be associated with the cumulative effect of air ionization. This ionization at the doses used did not influence activities of creatine phosphokinase, aspartate aminotransferase and alpha-hydroxybutyrate dehydrogenase. S.F.

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TOXICOLOGICAL AND HYGIENIC STUDIES OF WATER RECYCLED FROM OXIDANT-CONTAINING FLUIDS

Z. P. Pak, Yu. S. Koloskova, Yu. Ye. Bezumova, V. P. Petina, and M. M. Spirayeva *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 82-87 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 56-59

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Toxic-hygienic examinations of water reclaimed from peroxide-containing technical fluids show that the water needs further purification using sorbents that contain a reducing agent. In the absence of the latter, the reclaimed water exerts adverse effects on certain hematological parameters. Author

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RECOVERY OF SYNTHETIC ORGANIC ACIDS FROM HUMAN WASTE IN CLOSED LIFE SUPPORT SYSTEMS

Yu. Ye. Sinyak and I. L. Shulgina *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 88-92 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 60-62

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Organic acids were obtained in an alkaline medium from a mixture of monosaccharides-carbohydrates to be used in a closed life support system. Methods of analysis of mixtures of synthetic acids were developed. The composition of mixtures of organic acids was identified by paper chromatography. During electroanalysis the mixtures release calcium ions. The use of mixtures of synthetic organic acids as carbon source gives rise to an intensive growth of the yeast *Candida tropicalis* SK-4. Author

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EFFECT ON MOUSE SKIN OF RADIATION DIFFERING IN LINEAR ENERGY TRANSFER

N. Ya. Savchenko, A. I. Portman, and N. I. Ryzhov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 93-96 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 63-65

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Experiments were carried out to measure the time and severity of the radiation reaction of the skin of mice exposed to x- and gamma-radiations, protons with energies of 645 and 50 MeV as well as accelerated helium ions at doses of 200 to 4000 rad. It was found that relative biological effectiveness coefficients of 645 and 50 MeV protons were 1.0 and those of helium ions were 1.3 for the skin reaction at early and late stages of observation. No significant difference in time of manifestation of radiation-induced skin lesions related to radiations with various linear energy transfer was detected. Author

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EFFECT OF PERSISTENT REGIONAL VASCULAR HYPOTENSION ON GROWTH OF MALIGNANT TUMORS

F. V. Rudenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 3 Jul. 1981 p 97-99 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 65-67

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Weightlessness effects on the cardiovascular system of laboratory rats were simulated by prolonged arterial hypotension. Antitumor stability of the animal body increased. The effect resulted from the compensatory reactions in vessels of blastomas and adjacent tissues. It is recommended that such experiments is carried out in actual flights. Author

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DYSTROPHIC CHANGES AND FUNCTIONAL IMPAIRMENT OF DEAFFERENTIATED BONE MARROW

A. S. Zverkova, N. K. Simeonova, I. V. Abramenko, and V. P. Sobol *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 100-103 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 67-69

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Rat experiments showed that radicotomy of spinal cord roots at the L2-Z1 level causes functional disorders of bone marrow eliminating stimulation of hemopoiesis in response to acute blood losses. The deafferented bone marrow shows disturbed proliferation and differentiation of cellular elements and dystrophic changes in them. Author

N81-29756# Joint Publications Research Service, Arlington, Va.

ENDURANCE OF LOWER BODY NEGATIVE PRESSURE BY PILOTS WITH NEUROCIRCULATORY DYSTONIA OF THE HYPERTENSIVE TYPE

P. M. Suvorov, N. N. Artamonov, B. N. Tarnovskiy, and Yu. I. Bykova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May-Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 104-107 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May-Jun. 1981 p 70-72

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Cardiovascular function and lower body negative pressure (LBNP) tolerance were studied in 68 pilots with hypertensive neurocirculatory dystonia and 26 healthy test subjects (controls). Most dystonic subjects had distinctly peculiar features of cardiovascular compensatory reactions during LBNP tests and that 86.8 + or - 4.1 percent of them showed high tolerance to the exposure. Their cardiovascular function was compensated at the expense of a greater than, in the controls increase in the arterial tone. There were, however, many cases (13.2 + or - 4.1 percent) who displayed failures of cardiovascular compensatory reserves and who lost the ability to maintain a high arterial tone in response to the exposure. The use of provocative tests is the only method that helps identify compensatory capabilities of the cardiovascular system of pilots with hypertensive neurocirculatory dystonia and thus qualify them for their professional activities. Author

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QUANTITATIVE EVALUATION OF CLINICAL MANIFESTATIONS OF MOTION SICKNESS

R. R. Galle *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 108-112 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 72-75

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An original scheme of quantitative evaluation of clinical manifestations of motion sickness was developed. According to the scheme, eight major symptoms of motion sickness (vertigo, nausea, vomiting, sweating, paleness, headache, sleepiness,

flaccidity) are scored in relation to their manifestations. The scheme was used in vestibular tests of 57 test subjects. The vestibular test used is tolerance to cross coupled acceleration. On the basis of the scores quantitative criteria of human tolerance to vestibular exposures were suggested. The scheme can be widely used allowing statistical treatment, comparative individual and group analysis of the data obtained. Author

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EVALUATION OF METHODS FOR MINERALIZING RECYCLED POTABLE WATER USING A CONDUCTOMETER

S. V. Chizhov, Yu. Ye. Sinyak, M. L. Shikina, and T. I. Luzine *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 113-117 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 75-78

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The task of ongoing monitoring of the quality of water recycled from waste during space flight is studied. It is established that one can use the conductometric method for evaluating the quality of water regenerated from the condensate of atmospheric moisture, as it applies to space flight factors, according to dry residue and hardness. S.F.

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METHOD FOR SPECTRAL ANALYSIS OF EXTENSIVE TRACINGS OF PHYSIOLOGICAL PROCESSES

I. G. Nidekker *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 118-123 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 78-82

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A method is described for spectral analysis of lengthy tracings of physiological curves, which serve as the basis for devising a standard method of detecting latent periodicity of any physiological process recorded as a function of time. The question of dimensionality of periodic components of heart rhythm is discussed. The usual procedure for calculating the function of spectral density yields a curve, from the maximums of which one can determine whether a given periodicity is present. The dimensionality of these periods will be expressed in seconds only if the process being analyzed is a function of time. When interpreting the spectrum of cardiac rhythm, the base information (dynamic series of R-R intervals) is viewed as a function of time in several studies. However, the R-R intervals of the EKG are a function of sequential number of the cardiac cycle (CC), which itself is on a 'second' scale [dimensionality]. If this is not taken into consideration, the estimate of periods inherent in a given series of R-R intervals may be incorrect. The possibility of error on the example of plotting an autocorrelation function (ACF) is illustrated. S.F.

N81-29760# Joint Publications Research Service, Arlington, Va.

USE OF NOSPANUM IN COMBINATION WITH CERTAIN VITAMINS AGAINST SEASICKNESS

V. V. Usachev, V. V. Sabayev, A. D. Matveyev, and A. G. Popov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 124-126 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 82-83

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Three drug combinations were investigated for anti-seasickness effectiveness. The first product consisted of a combination of no-spa (50 mg), vitamins B1 (100 mg) and B6 (50 mg), and lactose; the second contained no-spa combined with vitamins B6 (50 mg), E (2.5 mg) and lactose (150 mg); the third consisted only of vitamins B1, B6 and lactose. Scopolamine in a dosage of 1 mg was used as the standard product. No positive effect on endurance of low levels of complex accelerations was demonstrated. S.F.

N81-29761# Joint Publications Research Service, Arlington, Va.

FLIGHT RELATED CHANGES IN PARAMETERS OF EXTER-

NAL RESPIRATION IN HELICOPTER CREWS

Yu. N. Kamenskiy *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 127-129 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 83-84

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Functional changes in the external respiratory system of helicopter crews are examined. Vital lung capacity (VC), the pneumotometric index (PTI) and maximum breathing capacity (MBC) before and after the flights were measured. The dynamics of postflight changes in MBC and PTI as a function of flying time. VC showed virtually no postflight change. S.F.

N81-29762# Joint Publications Research Service, Arlington, Va.

CHANGES IN BIOELECTRICAL ACTIVITY OF THE MYOCARDIUM OF FLIGHT PERSONNEL UNDER THE INFLUENCE OF THEIR WORK LOAD

V. D. Vlasov, Yu. D. Karnaukhov, and O. P. Dmitriyev *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 15, No. 3, May - Jun. 1981 (JPRS-78499) 13 Jul. 1981 p 130-132 refs Transl. into ENGLISH from Kosmicheskaya Biol. i Aviakosmicheskaya Med. (Moscow), v. 15, no. 3, May - Jun. 1981 p 84-85

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The question of functional capacities of flight personnel as related to age is examined. The functional state of the cardiovascular system, which largely determines the pilot's reaction to flights, is emphasized. Postflight changes in electrocardiography and vectorcardiography parameters did not exceed the range of conventional norms and were of no pathological significance. Some decline of adaptive capabilities of the myocardium with age with regard to flight factors was indicated. S.F.

N81-29763* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SWEAT COLLECTION CAPSULE Patent

John E. Greenleaf and Robert W. Delaplaine, inventors (to NASA) Issued 26 Feb. 1981 6 p Filed 19 Apr. 1978 Supersedes N78-22720 (16 - 13, p 1754)

(NASA-Case-ARC-11031-1; US-Patent-4,190,060;

US-Patent-Appl-SN-897828; US-Patent-Class-128-760;

US-Patent-Class-128-275) Avail: US Patent and Trademark Office CSCI 06B

A sweat collection capsule permitting quantitative collection of sweat is described. The device consists of a frame held immobile on the skin, a closure secured to the frame and absorbent material located next to the skin in a cavity formed by the frame and the closure. The absorbent material may be removed from the device by removing the closure from the frame while the frame is held immobile on the skin.

Official Gazette of the U.S. Patent and Trademark Office

N81-29764* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

INDOMETHACIN-ANTIHISTAMINE COMBINATION FOR GASTRIC ULCERATION CONTROL Patent

Patricia A. Brown (San Jose State Univ.) and Joan V. Danellis, Inventors (to NASA) (San Jose State Univ.) Issued 21 Jul. 1981 8 p Filed 10 Nov. 1977 Supersedes N78-11692 (16 - 02, p 236) Sponsored by NASA

(NASA-Case-ARC-11118-1; US-Patent-4,279,906;

US-Patent-Appl-SN-850504; US-Patent-Class-424-247;

US-Patent-Class-424-267; US-Patent-Class-424-274) Avail: U.S. Patent and Trademark Office CSCI 06B

An anti-inflammatory and analgesic composition containing indomethacin and an H sub 1 or an H sub 2 histamine receptor antagonist in an amount sufficient to reduce gastric distress caused by the indomethacin is described. Usable antagonists include pyrilamine, promethazine, metitamide and cimetidine.

Official Gazette of the U.S. Patent and Trademark Office

N81-29766# Baylor Univ., Houston, Tex. Dept. of Medicine.

ANALYSIS OF BODY CALCIUM (REGIONAL CHANGES IN BODY CALCIUM BY IN VIVO NEUTRON ACTIVATION ANALYSIS)

Wadi Suki, Philip C. Johnson, Adrian LeBlanc, and Harlan J. Evans Jul. 1981 108 p refs (Contract NAS9-13737)

(NASA-CR-161027) Avail: NTIS HC A06/MF A01 CSCL 06P

The effect of space flight on urine and fecal calcium loss was documented during the three long-term Skylab flights. Neutron activation analysis was used to determine regional calcium loss. Various designs for regional analysis were investigated. T.M.

N81-29767* Raines (Jeremy K.), Rockville, Md.
ELECTROMAGNETIC FIELD INTERACTIONS WITH THE HUMAN BODY: OBSERVED EFFECTS AND THEORIES

Jeremy K. Raines 9 Apr. 1981 124 p refs

(NASA-Order-S-75151B)

(NASA-CR-166661) Avail: NTIS HC A06/MF A01 CSCL 06R

The state of published knowledge about the effects of non-ionizing EM fields on humans is summarized. In addition to over 1000 written sources in-person meetings, telephone interviews and lecture tapes were used. It is indicated that there are good, bad and benign effects to be expected from non-ionizing EM fields and much more knowledge appears necessary to properly categorize and qualify EM field characteristics. Knowledge of the boundary between categories, perhaps largely dependent on field intensity, is vital to proper future of EM radiation for any purpose and the protection of the individual citizen from hazard. A.R.H.

N81-29768* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LOW X-RAY ABSORPTION ANEURISM CLIPS Patent Application

Robert M. Baucom, inventor (to NASA) Filed 15 May 1981 11 p

(NASA-Case-LAR-12650-1; US-Patent-Appl-SN-264381) Avail: NTIS HC A02/MF A01 CSCL 06B

An X-ray transparent and biological inert medical clip for treating aneurisms and the like is described. A graphite reinforced composite film is molded into a unitary structure having a pair of 'hourglass' like cavities hinged together with a pair of jaws for grasping the aneurism extending from the wall of one cavity. A silicone rubber pellet is disposed in the other cavity to exert a spring force through the hinge area to normally bias the jaws into contact with each other. NASA

N81-29769* National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

PRACTICAL ACTIVATION AND RETENTION OF LOCOMOTION CONSTRAINTS IN NEUROMUSCULOSKELETAL CONTROL SYSTEM MODELS

H. Hatze and A. Venter Oct. 1980 16 p refs

(CSIR-TWISK-184) Avail: NTIS HC A02/MF A01

Two approaches to the treatment of locomotion constraints in the neuromusculoskeletal control system models are discussed. The approaches are: (1) the modeling of viscoelastic environmental contact points to avoid the impact problem, and the subsequent reduction of the state space dimension by elimination of superfluous generalized coordinates; and (2) the computation of instantaneous velocity changes occurring during the impact, and the subsequent computation of constraint forces, the constraints remain satisfied for the period of their retention. It is shown that the latter approach is computationally more efficient. Detailed algorithms are also presented. E.A.K.

N81-29770* National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

MYOSIM, A COMPUTER PROGRAM FOR SIMULATING MYOCYBERNETIC MODELS OF SKELETAL MUSCLE

H. Hatze and J. Geyer Sep. 1980 81 p refs

(CSIR-TWISK-176) Avail: NTIS HC A05/MF A01

The computer program MYOSIM that simulates for different myocybernetic models is documented. A brief description of the equations defining these models is given, while special features are discussed which relate to the computerization of the models. Finally, the models are validated, and a variety of computer experiments described and simulation responses presented. It is emphasized that the computer program MYOSIM can be used in the teaching of the biomechanics and physiology of skeletal muscle. The program has a graphic-display option which makes it possible for the user to display all dynamic responses of the various models. The user can thus perform a large variety of 'computer experiments' on the muscle models and immediately observe the response of the model muscle. J.M.S.

N81-29771* National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

DISCRETE APPROXIMATION OF A CONTINUOUS MYOCYBERNETIC MODEL OF SKELETAL MUSCLE

H. Hatze Nov. 1980 16 p refs

(CSIR-SWISK-18) Avail: NTIS HC A02/MF A01

A discretization is presented of a continuous myocybernetic control model of skeletal muscle. The discretized version is especially suited for problems where the control parameter, rate of motor unit recruitment, changes rapidly in a bang-bang mode. This control mode cannot be handled well by the continuous model. Simulation results confirm the applicability of the discretized model. Author

N81-29772* Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AIRCRAFT INFLIGHT PHYSIOLOGICAL DATA ACQUISITION SYSTEM M.S. thesis

Kenneth L. Moore Jun. 1980 30 p refs

(AD-A100646; AFIT/GE/EE/80-6)

Avail: NTIS

HC A03/MF A01 CSCL 09/2

A design is presented for a self-contained, man-mounted data acquisition system to sample and store 12 environmental and physiological parameters. The design consists of one-megabyte of nonvolatile magnetic bubble memory storage, 16 analog input channels, and four digital input channels, and is controlled by a 6502 microcomputer. Operational software was designed and simulation conducted on a Rockwell System-65 minicomputer augmented with two-megabits of magnetic bubble memory. Two types of data storage methods are examined - continuous (or pulse code modulation), and three variations of delta pulse code modulation for reduction of data storage. Nonuniform sampling rates (or sampling jitter) caused by simultaneous sampling requests were investigated, and ways to reduce or eliminate the occurrence of jitter are also presented. Author (GRA)

N81-29773* Dayton Univ., Ohio.

TECHNIQUES AND PROCEDURES APPLIED TO PHOTOMETRIC METHODS FOR THE ANALYSIS OF HUMAN KINEMATIC RESPONSES TO IMPACT ENVIRONMENTS Final Report, 1 Sep. 1976 - 30 Apr. 1979

Philip A. Graf and Henry T. Mohlman Wright-Patterson AFB, Ohio AFAMRL Oct. 1980 209 p refs

(Contract F33615-76-C-0525; AF Proj. 7231)

(AD-A100918; UDR-TR-79-115; AFAMRL-TR-80-61) Avail: NTIS HC A01/MF A01 CSCL 06/19

This report presents the methods, techniques, and procedures developed and applied to photometrically evaluate the biodynamic responses of body segments to laboratory simulations of aircraft crash and escape system environments. These simulations were developed on the Horizontal Impulse Accelerator, the Hydraulic Decelerator, and the Body Positioning Retraction Device, all of which are facilities of the Biomechanical Protection Branch of the Air Force Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, by personnel of that organization. Application of these methods and techniques resulted in time histories of coordinate positions, relative to the test seat, of anthropometric points during the impact and response periods. GRA

N81-29774* Rhode Island Univ., Kingston. Dept. of Electrical Engineering.

A COMPUTER MODEL OF SACCADIC SUPPRESSION Final Report

William J. Ohley Jan. 1981 52 p refs

(Grant AF-AFOSR-0112-80; AF Proj. 2313)

(AD-A101038; AFOSR-81-0477TR)

Avail: NTIS

HC A04/MF A01 CSCL 12/1

This work provides a quantitative model of saccadic suppression in which the suppression of vision is shown to result from direct interaction of the spatial and temporal properties of the human visual system. The model can be divided into a spatio-temporal impulse response function, and a psychophysical detection process. The space-time impulse response function is derived from the retinal line spread function and know temporal response characteristics of humans. By assuming linearity, the saccade like motion of a slit of light passing over the retina is convolved in two dimensions with the space-time function. Inclusion of a single threshold decision rule then allows excellent prediction of experimental results. Author (GRA)

N81-29775# Payne, Inc., Annapolis, Md.
WIND TUNNEL MEASUREMENTS OF TOTAL FORCE AND EXTREMITY FLAIL POTENTIAL FORCES ON A CREW MEMBER IN CLOSE PROXIMITY TO A COCKPIT Final Report, Jun. 1977 - Feb. 1980

Harold L. Newhouse, Peter R. Payne, and James P. Brown Dec. 1980 90 p refs
 (Contract F33615-77-C-0523; AF Proj. 7231)
 (AD-A100917; AMRL-TR-79-110) Avail: NTIS HC A05/MF A01 CSCL 01/1

In order to determine the aerodynamic forces acting upon a crewmember/escape seat combination at transonic speeds, and the flail potential forces acting on the crewmember's extremities, an existing half scale man/seat combination was integrated with a model of the forward portion of the F-16. The combination was tested in the Arnold Engineering Development Center Propulsion Wind Tunnel (PWT) Facility Transonic Wind Tunnel (16T) during the period September 9 to September 15, 1978, over the Mach number range 0.4 to 1.2. The basic data obtained in this way are reported in Reichenau. The present report describes the experimental set-up in detail and presents some typical force and force area (force/sq q) plots. From earlier work it was determined that the flow over the model was 'supercritical', implying a turbulent boundary layer at separation, and a reasonably realistic simulation of full-scale conditions. Very marked interference effects were observed on the man/seat combination, due to fuselage proximity. The most dramatic were large increases in upper arm and upper leg flail potential forces. In almost all cases, the most severe interference occurred when a 'flow diverter' was mounted in front of the cockpit. Comparisons with other sources of data revealed generally good agreement, except that the drag of the model was somewhat low; presumably due to the fact that the model was smoother than its full scale equivalent. Author (GRA)

N81-29776# Oak Ridge National Lab., Tenn.
CHRONIC DERMAL TOXICITY OF EPOXY RESINS. 1: SKIN CARCINOGENIC POTENCY AND GENERAL TOXICITY
 J. M. Holland, L. C. Gipson, M. J. Whitaker, B. M. Eisenhower, and T. J. Stephens Jun. 1981 98 p refs
 (Contract W-7405-eng-26)
 (ORNL-5762) Avail: NTIS HC A05/MF A01

This report quantifies the cutaneous and systemic response of male and female C3H mice to skin application of selected commercial epoxy resins and amine curing agents, at the maximum tolerated dermal dose. Resins tested were: diglycidyl ether of bisphenol A (DGEBA) (CAS no. 1675-54-3); mixtures of the same resins with bis (2,3-epoxycyclopentyl) ether (CAS no. 2386-90-5; diglycidyl ether of resorcinol (CAS no. 101-90-6); N,N'-diglycidyl-5,5-dimethylhydantoin (CAS no. 15336-81-9); diglycidyl ether of neopentyl glycol (CAS no. 17557-23-2); A 70:30 mixture of the hydantoin and neopentyl glycol base resins; the amine curing agent menthane diamine (CAS no. 80-52-4); and a eutectic mixture of meta-phenylenediamine (CAS no. 108-45-2) and DGEBA. A DGEBA manufactured by Union Carbide Corporation in the mid 1970's and assayed for skin carcinogenicity previously was chemically characterized. The results of this analysis are included with the present data for comparison purposes. DOE

N81-29777# Environmental Protection Agency, Cincinnati, Ohio. Health Effects Research Lab.
HEALTH EFFECTS OF DIESEL ENGINE EMISSIONS: PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM HELD AT CINCINNATI, OHIO ON DECEMBER 3-5, 1979, VOLUME 1

W. E. Peplko, ed., R. M. Danner, ed., and N. A. Clarke, ed. Nov. 1980 591 p refs Proceedings of Conf. held in Cincinnati, Ohio, 3-5 Dec. 1979 2 Vol.
 (PB81-173809; EPA-600/9-80-057A) Avail: NTIS HC A25/MF A01 CSCL 06T

The purpose of this Symposium was to bring together scientists and engineers from the public and private sectors to discuss their research findings on the health effects of diesel engine emissions and to conclude with a discussion of health risk assessment of diesel exhaust. The Proceedings are organized into eight main sections corresponding to the format of the Symposium and addressing physical and chemical characteristics of diesel effects of diesel emissions and components, and biochemical and metabolic effects. GRA

N81-29778# Environmental Protection Agency, Cincinnati, Ohio. Health Effects Research Lab.

HEALTH EFFECTS OF DIESEL ENGINE EMISSIONS: PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM
 W. E. Peplko, ed., R. M. Danner, ed., and N. A. Clarke, ed. Nov. 1980 632 p refs Proceedings of Conf. held in Cincinnati, Ohio, 3-5 Dec. 1979 2 Vol.
 (PB81-173817; EPA-600/9-80-057B) Avail: NTIS HC A99/MF A01 CSCL 06T

The Proceedings are organized into sections corresponding to the format of the Symposium and addressing toxicological effects of inhaled diesel emissions, mutagenic and carcinogenic potency of extracts of diesel and related environmental emissions, mutagenicity of inhaled diesel emissions, carcinogenic effects of exposure to diesel emissions, and epidemiological studies. A panel discussion on health risk assessment of diesel emissions is included. GRA

N81-29779# Bureau of Mines, Pittsburgh, Pa.
A BREATHING METABOLIC SIMULATOR FOR TESTING RESPIRATORY PROTECTIVE EQUIPMENT
 Anthony W. Sparks, Richard L. Stein, and Jerry W. Stengel 1980 24 p refs
 (PB81-179913; BM-RI-8496) Avail: NTIS HC A02/MF A01 CSCL 06Q

The breathing and metabolic subsystem of the breathing metabolic simulator (BMS) are described. The BMS is a commercially developed device that uses a piston cylinder to stimulate breath movement. Using a propane furnace that consumes oxygen and forms CO₂, the BMS also simulates the respiratory metabolism of humans. The BMS was also tested against a pulsatile breathing machine (PBM). Both machines were used to test respiratory equipment, and the test results are compared. It is shown that BMS compares more closely to the results of tests that used human subjects than results obtained from the PBM. GRA

N81-29780# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DIGITAL CONTROL SYSTEM FOR AN ON BOARD OXYGEN GENERATOR M.S. Thesis
 Thomas C. Horch Dec. 1980 88 p refs
 (AD-A100823; AFIT/GEO/EE/80D-2) Avail: NTIS HC A05/MF A01 CSCL 06/11

A prototype on-board oxygen generation system (OBOGS) is being tested by the USAF School of Aerospace Medicine (SAM). The OBOGS is a candidate to replace present liquid oxygen systems for aircrew consumption on manned aircraft. The OBOGS passes outside air through a molecular sieve to produce an oxygen enriched breathing product. Oxygen concentration of the OBOGS's output is controlled by a purge orifice valve. The SAM envisions using a digital system to control the OBOGS. A digital control system for the OBOGS was developed and consists of a stepper motor, microprocessor, system sensor, support circuitry, and software. The control system software is a collection of instructions which allow the MPU to read data from sensors, to interpret that data, and to issue system hardware control signals. System software was fairly complex as methods were employed to compensate for the OBOGS's lengthy response time. This was accomplished by using a segmented table. If motor drive is anticipated to be time-consuming, a software routine is used to preposition the motor to a predetermined location within the segmented table. This position is updated when more accurate information is available. A prototype system was constructed and tested in the laboratory. The control system successfully controlled the stepper motor. Author (GRA)

N81-29781# School of Aerospace Medicine, Brooks AFB, Tex. Crew Technology Div.
EVALUATION OF A MANIKIN PSYCHOMOTOR TASK Final Report, Jan. - Oct. 1980
 David C. Reader, Russell A. Benel, and Alton J. Rahe May 1981 27 p refs
 (AF Proj. 7930)
 (AD-A100966; SAM-TR-81-10) Avail: NTIS HC A03/MF A01 CSCL 05/1

A small, self-contained microprocessor displays a manikin on a TV screen in various orientations. Subjects are required to chose lateralities depending on a shape also presented on the display, and performance (accuracy and reaction time) is automatically recorded. This task has been evaluated at the USAF School of Aerospace Medicine. Data are presented to show that

the task is simple to use, can be learned by all subjects, and that plateau performance can be quickly established. The various presentations were examined for difficulty; subjective and objective measures of performance were compared, and repetitive effects were sought with similarities of presentation in sequence. The analyses showed that control performance with this task was essentially constant over the experimental period.

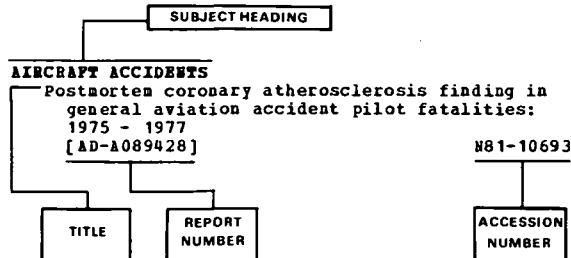
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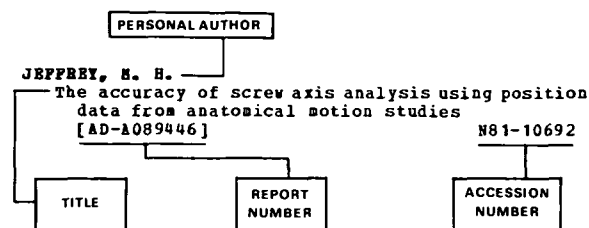
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